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VASCO NUÑEZ DE BALBOA, 1513-1913.*

By Sir CLEMENTS R. MARKHAM, K.C.B., F.R.S.

We have, on several previous occasions, commemorated the memories of famous geographers and discoverers of former ages; of Pytheas, the discoverer of our island, of Columbus, Prince Henry the Navigator, and Vasco da Gama, of the Cabots, of our Elizabethan navigators generally, and of Franklin and his lost companions. Such commemorations were intended to arouse and maintain an interest in historical geography, which is an essential part of our science, and I believe they have had that effect.

I now propose to ask the attention of the meeting to a very great and most important discovery, that of the Pacific ocean, and to its results. Its discoverer was one of the best of the Spanish Conquerors, one who overcame by far the greatest difficulties by the most praiseworthy methods, whose life was as romantic as his death was deplorable and sad.

The actual anniversary will be next September, but, as the session will then be over, we keep it now instead—anniversary of the time of preparation. Our hero to-night is Vasco Nuñez de Balboa, his achievement, the discovery of the Pacific ocean 400 years ago. It is impossible for any man who achieved greatness to have commenced under more depressing and apparently hopeless circumstances.

Two great expeditions had been sent from Spain and St. Domingo to form colonies on the coasts from Carthagena to Veragua. Both were mismanaged, their leaders were dead, survivors were scattered along the coast, dying of fevers and starvation, the miserable remnant in the fort at the Gulf of Darien came away in a rickety, leaking craft, but were sent

* Royal Geographical Society, April 28, 1913. Map, p. 612.

back. The problem was to turn this disastrous mess into a thriving colony without outside help. Few would attempt it. Much fewer could succeed. And who was the coming man? A penniless fugitive, with no authority, no official appointment of any kind, one who was in Enciso's ship, headed up in a cask to escape from his creditors. Thus we first hear of Vasco Nuñez de Balboa.

The name of Enciso induces me to ask the meeting to bear with me in a very brief digression. We should cherish the memories of the *geographers per se* of olden times. Martin Fernandez de Enciso knew all the geography of his day. He was a cartographer and a surveyor. He was a good observer. His latitude of Cabo de la Vela is absolutely correct. He was so far a physiographer that he was able to describe what he saw accurately and in some detail. His "Suma de Geografia," consisting of eighty leaves (Seville, 1519), is excessively rare; a copy was sold lately for £80. We may revere the memory of this geographer *per se*, though debarred from giving the title to ourselves.

To return to our hero. Enciso landed him among the forlorn people at the fort, in the Gulf of Darien, and then departed. He was recognized at once as a born leader. He had a magnetic influence over men, who were led to feel confidence in him. Even the fierce Francisco Pizarro, who was older and actually in charge, at once became his follower. The first care of Vasco Nuñez was to gather together the scattered remnants of the former expeditions, some at the Uruba fort, others in refuges along the coasts living with Indians. This was a most difficult service, but thanks to the energy of one man it was done. He fed the hungry, nursed the sick, allotted lands and helped to build huts for the able-bodied, and things began to improve. But the supply of food was the great difficulty.

Here the misconduct of predecessors in the robbery and cruel treatment of the natives formed the main obstacle. Vasco Nuñez had to gain their confidence, and to overcome their suspicions aroused by the cruelties of Ojeda and others who had gone before him. He succeeded with the natives just as he had succeeded with his own countrymen. His conciliatory address won over warlike tribes who had been burning under a sense of cruel injuries unavenged. Yet he had to wander far to gather in provisions. Often he and his men had to wade through swamps for miles under a burning sun, naked with their clothes on shields on their heads, before they could find cultivation and induce the natives to bring their products to the Spanish market. Yet in time his wise policy, his energy and patience overcame all obstacles, markets were well filled at the gates of his fort, and confidence in the great leader's integrity and justice was established.

Then came the time for Vasco Nuñez to seek for the succour that his success gave him a right to expect. There was one rickety little craft at his command, and he sent her to San Domingo with an urgent request for help and for recognition. The admiral, the son of Columbus, responded

to both requests. Two vessels were despatched laden with provisions, and Vasco Nuñez received from the *Audiancia* of San Domingo the appointment of *Alcalde Mayor* or Chief Magistrate of the colony he had created.

Vasco Nuñez then gave his attention to the discovery of the isthmian region, to collecting information respecting the sources of gold supply, and respecting the other resources of the country. He became intimate with the native rulers, the chiefs of Coiba, of Comogre, and of Pocorosa, and established most friendly relations with them. A long and detailed despatch from Vasco Nuñez de Balboa to the Emperor Charles V., describing all his proceedings, has been preserved, and is in the collection of Navarrete.

It was in those days, while visiting and collecting information from the friendly chiefs of Darien, that Vasco Nuñez received the startling news from a son of one of the chiefs that, on the other side of the mountains, there was a vast illimitable ocean. Then, with a few followers, and guided by his native friends, the great discoverer forced his way through the dense forest, and climbed the heights until the wide expanse of ocean burst upon his astonished gaze. The poet Keats records a kindred feeling to that

> "Of stout Nuñez,* when with eagle eyes,
> He stared at the Pacific, and all his men
> Look'd at each other with a wild surmise
> Silent upon a peak in Darien."

There are moments, moments when words fail utterly to express the thoughts. Such a moment was this. They were "silent upon a peak in Darien."

The story tells how Vasco Nuñez de Balboa descended the western slopes, and rushed into the sea waving the flags of Castille and Aragon over his head. It may have been so. It is certain that he devoted his few remaining years of life to the construction of ships, that he might sail on the ocean of his discovery. The name of Pacific ocean is due to the young son of the Chief of Comogre who gave Vasco Nuñez information of its existence. He said that the other great ocean was always smooth, and never rough like the Caribbean sea.

I look upon the discovery of the Pacific ocean as the greatest achievement, at least in its consequences, that was made and done in that age of derring-do; for it was due as much to the discoverer's humane policy as to his courage and resolution, as much to his statesmanship as to his gifts as a leader of men.

From that time until his death, the aim of the discoverer's life was to navigate this Pacific ocean. He had entreated the Emperor to allow him to complete the great enterprise he had begun so well. The answer was the despatch of an incompetent, violent-tempered, unprincipled gold

* Keats, in ignorance, wrote Cortes for Nuñez, but he meant the discoverer of the Pacific, whatever his name was.

seeker, with influence at court, to supersede him with a large force. Pedrarias brought with him a bishop, who was a good man, able to appreciate the work of Vasco Nuñez, but he also brought a gang of adventurers of the worst type. It was towards the end of July, 1514, that Pedrarias, with his forces, arrived at Santa Maria de Uraba, and it is characteristic of Vasco Nuñez, that he was found in his shirt-sleeves helping the colonist to thatch his house.

It was due to the intervention of the good Bishop Quevedo that Vasco Nuñez was at last allowed to undertake the launch of ships on the Pacific. He had seen all his wise policy reversed, the friendly natives turned into enemies, and he had written a despairing letter to the Emperor. There remained for him the building of ships on the Pacific shore in which to sail away and make new discoveries.

Vasco Nuñez took the first step by sending one Francisco Garavita to Cuba, to bring back the materials for building the ships or brigantines as they were called. A port was formed at a place called Acla, where the materials were to be landed, and whence a road was to be made over the mountains to the other side of the isthmus. The timbers were cut and fashioned at Acla, where the iron work, cordage, and the rest of the ships' furniture were landed.

It was a Herculean task to convey all this through the dense forests and across the mountains. The chief Careta, who was the father-in-law of Vasco Nuñez, supplied the carriers. There was much suffering from want of provisions, but Vasco Nuñez was the man to overcome difficulties, and he was well seconded by followers of his own choice. Finally the materials were conveyed across to the shores of the Gulf of San Miguel. The work of building the ships was then commenced, but there were still difficulties. An exceptional tide came up carrying away part of the timber and burying the rest in the mud, and the workmen had to save themselves by climbing up the trees. Fresh timber had to be hewn and fashioned on the spot. It was due to the great and rare qualities of Vasco Nuñez, to his magnetic influence over men, and to his close attention to details, that the vessels were finally completed and launched. He had four vessels and 300 men ready to navigate the South sea.

A Venetian astrologer had once told Vasco Nuñez that when he should see a certain star, which he named, in a certain part of the heavens, his life would be in danger. One evening after the ships were ready to sail he saw the fatal star in the quarter indicated by the astrologer. He laughed at the prediction, for was he not on the high road to fortune? The very next day he received an urgent message from Pedrarias requiring him to come at once to Acla, as his advice was needed on a question of importance. Quite unsuspicious of any treachery, Vasco Nuñez set out at once to obey the summons. Just outside the settlement of Acla he was arrested and bound by his former friend and follower Francisco Pizarro. The great discoverer exclaimed, "What is this,

Francisco? You were not wont to come out in this fashion to receive me!"

We need not dwell on the particulars of the murder. It was not even a judicial murder, for the Judge Espinosa protested. It took place in 1517, when Vasco Nuñez was in his 42nd year.

The death of Vasco Nuñez is one of the greatest calamities that could have happened to the natives. He had collected his little fleet in the Gulf of San Miguel, and was about to sail away into the unknown ocean he had discovered. He would thus have become the discoverer of the great Empire of the Incas, and the conquest of Peru would have been a very different story from that which is now interwoven with the name of the false friend of Vasco Nuñez, the ruthless Francisco Pizarro. For Vasco Nuñez was one of those men who are born to govern their fellows. He had the true genius of a statesman and a warrior, was as humane and judicious as he was firm of purpose and indomitable of will. And this great man was destined to fall through the mean jealousy of an incapable ruffian placed in power through court influence.

Pedrarias used the ships of Vasco Nuñez to sail along the coast to a bay where, in 1519, he founded the city of Panama. The ships of Vasco Nuñez did further service in the discovery of the coasts of Burica and Nicaragua.

And now how much, or rather how little, do we know of this famous isthmus of Darien, how little though French and American engineers have been calling the attention of the world to their wonderful proceedings for a long course of years.

Vasco Nuñez de Balboa discovered, diligent Pascual de Andogoya described the discoveries. Wafer lived for some months among the Indians, and wrote an interesting account of them.* My old colleague, Laurence Oliphant, gave us a paper on the Bayanos river, the narrowest part of the Isthmus.† Elliot Warburton wrote a charming account of the unfortunate Scottish colony. But I am not aware of any full and satisfactory geographical description either of the basin of the Bayanos or of the basin of the Chacunague. There is still much for geographers to do and to learn even in this Darien isthmus.

Never were truer words spoken and never were they more needed than when our President emphatically reminded the Society that there could not be a greater mistake than to suppose that the work of exploration is over, and when he expressed his conviction that there is enough work for travellers and explorers for the next hundred years to come.‡

Now let us consider the results of this great discovery by the murdered hero. We shall see how the difficulties of navigating the Pacific ocean were overcome by men whose services were only second in importance to

* 'Dampier's Voyages,' 3, p. 344 (ed. 1729).

† In 1865.

‡ January 15, 1912, R.G.S. *Journal*, vol. 39, No. 3, p. 218.

those of the discoverer himself; we shall see how navigation was hindered, how by that hindrance communication was long delayed, and commercial exchanges rendered almost impossible on several leading Pacific routes; and how at last the problems were solved by gifted men with some share of the genius of Vasco Nuñez de Balboa.

We will first take the west coast of South America. It is well known by what painful degrees Pizarro's pilot, Bartolomé Ruiz, brought the ruthless invader along the coast. How, on the Isle of Gallo, only sixteen men could be found to stand by him and continue the enterprise, owing to the starvation and hardships.* But when the voyage had to be continued from Callao to Chile it became even more tedious and difficult. There was a constant south wind and an Antarctic current, since called the Humboldt current. It was easier to go from Peru to Chile by land over the vast desert of Atacama than by sea.

Juan Bautista de Pastene, a Genoese pilot, was looked upon as one of the best seamen on the west coast; yet when in 1547 he was sent to Chile to take the news of Gonzalo Pizarro's rebellion to Pedro de Valdivia, the voyage occupied eight months, anchoring every night.

Ten years later when the Spaniards in Chile were hard pressed by the Araucanian Indians, and sorely in need of reinforcements, it was the same story. Ten ships sailed from Callao under the command of Don Garcia Hurtado de Mendoza, afterwards Marquis of Cañete and a famous viceroy of Peru. He had with him the poet Alfonso de Ercilla, who sang the story of the voyage. Slowly the ships began to move with pennons and streamers from every mast head and every yard arm. The wind filled the sails, sacers, falconets and falcons resounded, and San Lorenzo point was passed. Then there was another tale to tell. Auster blows full in their faces, and they run under the land and anchor not 30 miles from Callao. Next day they start again without the pennons and falcons and falconets.

"Then Auster meets them in the face,
Each ship must alter course apace,
And strive to meet the adverse sea
While furious Auster drives alee.
The fleet for refuge seeks the land
For Chincha's port was close at hand.
Again they venture from the shore
Off Nasca's point to stop once more.
At noon they face the southern gales
And to their fury show their sails;"

* Sixteen men crossed the line: (1) Bartolomé Ruiz (pilot); (2) Pedro de Candia (a Greek); (3) Cristoval de Peralta (settled at Arequipa); (4) Alonzo Briçeño (returned to Spain); (5) Nicolas de Ribera (treasurer, settled at Cuzco); (6) Juan de la Torre (settled at Arequipa); (7) Francisco de Cuellar; (8) Alonzo de Molina (died at Tumbez); (9) Domingo de Sora Luce; (10) Pedro Alcon (fell in love, no further use); (11) Garcia Jaren (made a statement); (12) Anton de Carrion; (13) Martin de Paz; (14) Diego de Truxillo (wrote an account, MS. lost); (15) Geronimo de Ribera; (16) Francisco de Villafuerte (first to cross the line, settled at Cuzco).

and so on, anchoring every night, until after many months they at length reached Penco, the port of their destination in Chile.

The sailor who discovered the way south without all these delays, certainly performed a very great service. His name was Juan Fernandez. I believe that he was a native of Moguer. He is first heard of coming from Guatemala with the invader Alvarado. He was condemned to death by Almagro, but Pizarro, who appreciated his value as a pilot, granted him a pardon.

This very able seaman thought the matter out and formed his conclusion. The date of his voyage was, I believe, in 1563. He ran out from Callao before the Trade wind, working to the south until he encountered the westerlies, and then running before them into Valparaiso. He performed the voyage in twenty days, discovering the two islands of Masatierra and Masafuera on his way, ever since known as Juan Fernandez, made famous in after years as the abode of Alexander Selkirk. The feat of seamanship on the part of Juan Fernandez won for him very full official recognition. It was indeed a most important discovery. He received a grant of land in the lovely valley of Quillota in Chile, and though advanced in years he took to himself a young wife named Francisca de Soria. He was eighty when his son Diego was born, and his descendants were still living at Quillota when I was there.

The first important use that was made of the new way to Chile was when the Spaniards were defeated by the Chief Pelantaro at Curalaba, and the Governor Oñez de Loyola was killed in December, 1598. An urgent appeal for reinforcements was sent to Callao. Francisco de Quiñones commanded the succouring squadron. He stood out for many miles from the land before the Trade wind, working southwards, and performed the voyage from Callao to Concepcion in the then unprecedently short time of 16 days, from the 12th to the 28th of May, 1599.

It is to these consequences, these results that a great discovery owes its importance to mankind, and the makers of them rightly share reflected glory from the genius of the first discoverer. The value of a discovery must be reckoned by its uses to science, by the additions it makes to human knowledge, by its effects in the increase of wealth, or in other benefits to mankind.

Discovery which does none of these things is not worth making. It is for this reason that, in advocating polar research, I have always deprecated merely reaching either poles as main objects for an expedition, unless some scientific end is also to be gained. Such journeys, useless in themselves, have not only the effect of diverting energies from useful work, but also have other evil effects—they bring the work of explorers down to a lower plane.

When such a wonderful journey, as Captain Scott and his gallant comrades made, is intended to combine, and does combine, important scientific results with an unparalleled feat in travelling, there can be nothing but praise and admiration.

To plant the Union Jack on the South Pole by the unaided efforts of men dragging a loaded sledge was a grand achievement. But, to my mind, there was, if possible, even greater heroism when our countrymen, nearly at the last gasp of exhaustion, continued to drag that precious load of stones which was to reveal the past history of a vast region.

The whole story, opening with the launch of the *Discovery*, culminating with the Union Jack flying on the South Pole, closing with the memorial service at St. Paul's, is an epic which will live in the hearts of Englishmen for all time.

But to return to the discoveries of the Pacific ocean.

Were those men thinking of who could race first across the newly discovered ocean, get most praise, and make most money, when they were

"silent upon a peak in Darien."

I think not. Their thoughts were far enough from that. They could not turn them into words, but we cannot doubt that they vaguely dwelt on the mighty consequences of the discovery. It is those men who labour for others, whose work is designed for and has the result of benefiting mankind, and who seek to advance science, such men as Franklin, as La Perouse, and Scott, whose enterprises are intended to be permanently useful, who are the true discoverers.

It is with these considerations in our minds that we are best able to weigh the merits of those who solved the navigation problems of the Pacific ocean. The discovery of the route down the west coast of South America was very important, but the way to make the voyage across the great ocean *and back*, not across only, but across *and back*, was an equally important discovery.

With the discovery of the great ocean by Vasco Nuñez de Balboa before him, Magellan became convinced that if he sailed far enough down the east coast of South America, he must either find a strait or the termination of the land, and so enter the South sea as it was called. It seems simple enough to us now, as all great conceptions are apt to do unless we place ourselves exactly in the position of the conceiver. But it was a great conception, and Magellan was the man to carry it out. He discovered the strait which, after several attempts to give it other names, will now bear his name for all time. He sailed across the Pacific ocean, and was the very first that ever crossed it, meeting his death at one of the Philippine islands.

That was in 1520, only seven years after the discovery by Vasco Nuñez de Balboa. His voyage was a memorable achievement, and no explorer has a greater claim to commemoration by posterity; but that will be after my time.

In a few years the expedition of Garcia Jofre de Loaysa followed that of Magellan on the same quest to reach the Spice islands by the west and claim them for Spain. In August, 1526, Loaysa and his successor,

Sebastian del Cano, died and were buried in mid ocean. But their successors persevered, and one of the ships reached Tidore, one of the Spice islands.

In 1527 an expedition was despatched from Mexico commanded by Juan de Saavedra, to ascertain the state and condition of Loaysa's expedition, and he also sailed across the ocean reaching his countrymen at Tidore.

Next, in 1542, Ruy Lopez de Villalobos, with a small squadron, also sailing from Mexico, arrived among the Spice islands, with a second vessel commanded by Yñigo Ortiz de Retes.

Now, the reason that I have enumerated these expeditions, the first four to cross the Pacific ocean, and I hope I have not bored the meeting very much in doing so, is that they never came back. They tried to come back, but they did not know how to come back, and they never did come back.

The use of an ocean highway is that ships may pass to and fro, keeping up communication, exchanging products, promoting wants and supplying them. Obviously, if ships can only go one way, and cannot return, their voyages are of no use. There can be nothing but failure, and that is what befel all the four expeditions I have mentioned.

Magellan's ship, the *Trinidad*, commanded, after his death, by a good and persevering officer named Gonzalez Gomez de Espinosa, was put on a course to return across the ocean, but the adverse winds baffled her. Espinosa tried all he knew, provisions failed, and in the end he was obliged to surrender his ship, his men, and himself to the Portuguese.

The survivors of Loaysa's expedition held the island of Tidore for some time, they could not return, they made a brave fight and their story has been most ably told, but at last they were fairly worn out. Their own sovereign abandoned them, giving up his claim to the Spice islands, and the gallant remnant got passages home in Portuguese ships.

Saavedra put his ship on a course to return across the ocean, but he was baffled as Espinosa had been baffled. Worn out with anxiety and want of rest, he died while striving against the contrary winds. He was a good seaman and a man of intelligence. I believe that Saavedra was the first to propose the construction of a canal across the isthmus of Panama.

Villalobos, who commanded the fourth expedition, I have mentioned, died at Amboyna. His second in command, Yñigo Ortiz de Retes, attempted to return across the ocean to Mexico, and he was the discoverer of the whole northern coast of New Guinea. But he too was baffled.

Now, the discovery of the way to cross the Pacific is a small thing as regards utility, compared with the discovery of the way to cross the Pacific *and to return*, thus enabling the ebb and flow of commerce to pass over the vast ocean. The man who made that discovery is to be ranked with Fernandez, as a worthy developer of the great achievements of Vasco Nuñez de Balboa.

He was no ordinary man. Andres de Urdaneta was a Basque, and, needless to say, of good family, for all Basques are of good family, but he was also a well-educated gentleman. Inspired by the love of adventure, he joined the expedition to the Spice islands of which his friend Sebastian del Cano was chief pilot. His age was then twenty-six. Four commanders succeeded each other in command of the expedition, and Urdaneta was not one of them. But he was certainly the ablest member of that ill-fated expedition, and the loyal and trusted adviser of its commanders, in fights with the Portuguese, in negotiations with them, in the management of the Spaniards who found themselves deserted by their sovereign, in preserving the loyalty of some of them under very trying circumstances, and in arranging for their return home. He then wrote a most interesting account of the Loaysa expedition.

Urdaneta, when he reached his native country after an absence of many years, had navigated through Magellan's strait, had crossed the Pacific, had become well acquainted with the eastern archipelago, and had circumnavigated the globe, though not in one ship. He continued to serve his country in various capacities and eventually went out to Mexico. As his age advanced, he took a serious view of life, and became a monk in the Franciscan convent.

In 1564 it was resolved to send an important expedition from Mexico, to take possession of the Philippine islands, the command being given to Don Miguel Lopez de Legaspi. Although Urdaneta was now in his sixty-seventh year, and had become a monk, it was felt that there was no man so fit for the post of chief pilot of Legaspi's fleet, and even a royal request reached him. Refusal was not possible, and Urdaneta sailed as chief pilot.

The expedition was a complete success, and the Philippines became a Spanish colony, but that success was dependent on trade with Mexico, and the old question of a return again became important. All attempts to return had hitherto failed. But the pilot-monk, with all the long experience of his youth, had, like Juan Fernandez, combined the knowledge of a seaman with a habit of keen observation, and brought all his talent to bear on the problem to be solved. His plan was to sail north until he met with winds blowing in a contrary way to the prevailing Trade wind, arguing that the wind constantly blowing one way in certain latitudes, must return and blow in the opposite direction over some other area. His plan was to sail north until the wind was found which would take him across to America. Urdaneta announced his plan, and sailed from Zebu in June, 1565. His theory proved correct. He sighted the coast of California in about 40° N. and made a prosperous voyage thence to Acapulco. Andres de Urdaneta thus ranks side by side with Juan Fernandez as one of the great developers of the discovery of Vasco Nuñez de Balboa.

A shameful fact must here be mentioned. A captain of one of the

small vessels of Legaspi's fleet heard of Urdaneta's plan, secretly slipped away from another island several days before Urdaneta sailed, reached Acapulco a week before him, and claimed the merit of having discovered the new route. He was arrested and sent back to be dealt with by Legaspi.

Urdaneta's great discovery, for it rightly takes rank as a discovery, led at once to a flourishing trade between Mexico and the Philippines. The details of one of these voyages, that of Francisco de Gali, became known to Hakluyt. Gali appears to have sighted the coast of California in 37° 30′ N. Cavendish captured a richly laden ship making a voyage by this route, off Cape San Lucas on November 14, 1587. A lucrative commercial highway had been established as the result of Urdaneta's discovery.

The Viceroys of Peru did not neglect the duty of making discoveries in the Pacific, besides causing careful surveys to be made of Magellan's strait by Ladrillero, and later by Sarmiento. The expedition of Mendaña discovered the Marquesas and the Solomon islands, Quiros explored the New Hebrides, and Dr. Corney has now brought to light the important expeditions despatched from Lima to Easter island, and to Tahiti some years before the first visit of Captain Cook.

To Juan Fernandez and to Andres de Urdaneta the greatest merit must be conceded in making the routes of the Pacific ocean useful as highways of commerce, but all the famous Pacific navigators, first Spanish and later chiefly English,* have combined in building up a history which has enthralled us, and will continue to interest many generations yet unborn. There are still vast areas of our globe to discover and to explore. There is also much for us to discover in the history of geography. I have alluded to the valuable labours of Dr. Corney. Discoveries have also been made quite recently by Mrs. Nuttall of even greater value, relating to the voyage of Sir Francis Drake. And there is still much undiscovered which will hereafter be added to a glorious record, the first line of which was written on that peak in Darien 400 years ago by Vasco Nuñez de Balboa, whose great discovery we commemorate to-night.

The PRESIDENT (before the paper): Our veteran ex-President, Sir Clements Markham, who has rendered so many services to our Society and to the cause of geographical science in this country, was to have been personally here this evening to read the paper which he has composed upon Nuñez, the famous Spanish explorer, who was the first European, I suppose, to see the Pacific. Unfortunately, the state of Sir Clements' health prevents him from being present to-night, and accordingly the task of reading the paper has been kindly undertaken by the gentleman sitting on my left. Mr. Glanvill Corney has spent a good many years in Fiji, and has devoted himself with great success to the study of the Spanish records of discovery in the Pacific.

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* Drake, Hawkins, Dampier, Anson, Byron, Wallis, Cartaret, Cook, Vancouver, Fitz Roy, Darwin, Kellett, Beechey, Denham, and the historians of the Pacific, Dalrymple, Burney, and Hawksworth.

While lamenting the absence of the author of the paper, you will agree with me in congratulating ourselves that it will be read by so competent a substitute.

The PRESIDENT (after the paper): In almost the concluding sentence of Sir Clements' paper, you will have heard a reference to Mrs. Nuttall. I am glad to say that lady is present this evening. She has been, as you know, for many years a keen student of the history and antiquities of Central America, and quite recently in her researches in Mexico, Spain, and elsewhere, she succeeded in discovering some very interesting and hitherto unpublished records, throwing a good deal of valuable light on the life and character of Drake. Some of the results of her researches were published in a recent number of the *Geographical Journal*. Perhaps as she is present, this lady will do us the favour of saying a few words.

Mrs. NUTTALL: Among many points of interest, there is one which is established by the Spanish documents on Sir Francis Drake's Voyage of Circumnavigation, which I am preparing for publication, namely, the utter falsity of the accusations that were brought by the Spanish ambassador at the court of Queen Elizabeth against him for having cruelly murdered and maimed Spanish subjects. I have collected the testimony of seventeen of his prisoners as to the treatment they received, and all agree that "Drake killed no man." It is possible, however, to trace back to its origin the false rumour which was spread along the coast of South and Central America, accusing Drake's men of having hanged a pilot. Later on this was exaggerated to their having stabbed the pilot to death with a dagger. When Drake, however, reached England after his great voyage, he found that the Spanish ambassador accused him not only of having killed a number of Spanish subjects, but of having cut off their hands or arms and otherwise mangled them.

Drake indignantly demanded that an official inquiry be made, and that all of the gentlemen and members of his crew be subjected to an interrogatory. As is well known, they all responded and signed the denial of these grave charges which now exists in the Record Office.

Previously to resorting to the plan of seizing pilots acquainted with the coast, who could show him where water could be obtained in safety, Drake had lost several of his men when they had landed for this purpose. On the island of Mocha the Indians were in a state of rebellion, and attacked the Englishmen, believing them to be Spaniards.

On another occasion a man named Richard Minivy lost his life. On reading the account of his death as given by his own countryman in the 'World Encompassed,' one would think that he had been a victim to his own foolhardiness, being termed "overbold," and having "chosen to die" there. From the official Spanish report we learn, however, that what he actually did was to muster the men who were under his charge, and to order them to wade out to the rock where their boat was awaiting them. In order to cover their retreat, he faced the advancing Spanish horsemen, shot his arquebuse at them, and then drew his sword, whereupon he was shot dead.*

It is a pleasure to present Richard Minivy, as a newly discovered hero, to his own countrymen, for, as the Spanish record reveals, he gallantly risked his own life to save his imperilled companions.

Sir EVERARD IM THURN: I am glad of this opportunity of expressing my great appreciation of the paper by Sir Clements Markham which has just been read to us by my friend Mr. Glanvill Corney. It puts clearly, briefly, and in an easily

* It is stated in the same record that "on the breast of the dead man they found a book, in the margins of which were many quotations from Holy Scripture. This was seized by the civil authorities, who burnt it as "heretical."

understood form, the story of the first recorded sight by men of European race of the Pacific ocean. It has always seemed to me rather difficult to find any connected story of that glimpse of the great ocean which was vouchsafed to Nuñez from "the peak in Darien"; and we are much indebted to Sir Clements Markham for having now told the story so well. He has also dealt incidentally with the subsequent history of the Pacific during the four hundred years which have now elapsed since its discovery. While listening to his paper and looking at the great map which hangs before us, I could not help thinking over the partly fragmentary story of the happenings in the Pacific during those four hundred years. As Sir Clements Markham has indicated, for a long number of years after 1513 there was no real detailed discovery work done in the Pacific; and, except along the western coast of South America, almost the only thing that happened after Nuñez's discovery was that very occasionally ships of various nationality sailed across that "silent sea," but without making any definite discoveries, or at least without making any known record of such discoveries. The first time at which definite results accrued to civilization from the discovery, was at the period of our great English discoverers and their French contemporaries, when Byron, Carteret, Wallis, Cook, and Bougainville discovered so much of the coasts and islands of the South Seas; and it is especially to Captain Cook and his companion Sir Joseph Banks that we owe the first settlement of Europeans in the Pacific, at Port Philip in New Holland, or, as we now say, at New South Wales in Australia. Again, it is to the formation of this first settlement on the western side of the Pacific that we owe very much of the further practical development which has taken place in those parts; for it was in consequence of the existence of this new settlement that ships were first attracted and in ever-increasing numbers into the waters of the western Pacific, some to trade from the homeland and from the settlements in New England, on the east coast of America, to the new settlement, and thence on to the East Indies, to China, and some to fish for the sperm whales which then abounded in those waters. It was these ships which in the course of their voyages discovered the coasts and islands which Cook and his companions had not discovered. The story has hardly as yet been adequately told, but it is only fair to attribute a large share in these later discoveries to the ships from New England. Long before Captain Cook's time there had grown up in New England a colony of the most extraordinarily successful and daring seamen and traders; and these, after the Declaration of Independence, were not very well received in the older parts of the world. Finding themselves more or less shut off from the ports of the Old World, these New England seafarers diverted much of their enterprise into the newly discovered South Seas, when at Port Phillip there had come into existence a settlement where they could dispose of part of their cargo, and could take in fresh stores. It is to the ships attracted by the settlements in Australia that we owe the discovery of such islands as had not been found by Cook and his followers, English, French, Russians, or Americans. Some of us may be excused for a little regret that there is nothing else in the Pacific to be discovered—no other islands. Instead there is busy development of great trade routes across the Pacific. The trade routes from Vancouver and San Francisco across the northern and central Pacific, have now for some time been in active use. We are told that next year the Panama canal will be opened, affording a new and more southern trade route across the Pacific, making a most enormous difference to the trade of the world, in that it will, four hundred years after Nuñez crossed the isthmus, do away with that impossibly difficult land passage across Panama.

Mr. Glanvill Corney: I should first like to thank the audience for the quiet and careful attention they have been good enough to bestow on my effort to read

Sir Clements Markham's paper. Two sentiments have been awakened in my mind by that fact, one of which is that I am quite satisfied that the event, the achievement, we are here to-night to commemorate is accepted as one of intrinsic interest and importance by you all. The other is, that Sir Clements has succeeded in putting together his views, first of all his narration of Nuñez's doings, and then his comments on them and on their results, in a very able and charming manner. There are one or two little points that are related in connection with the experience of this Nuñez that have not been mentioned in detail in the paper, and that perhaps I might be allowed a few moments to refer to. The career of this man was, if one may call it so, a meteoric one. He makes his first appearance upon the stage of history by emerging from a cask, or, as some writers say, from the folds of a sail or tarpaulin, in which he had stowed himself away to escape from his creditors. He is successful in overcoming the ire of a wordy skipper when his presence is revealed on board. He next, after a few days' voyage, lands in a newly formed colony, and promptly becomes its governor, the previous governor voluntarily becoming one of his officials. Then he discovers the Pacific ocean, which I won't dilate upon any further; but the reward he got was to be beheaded by his friends, to have his head stuck on a pole and exposed to the populace, and his name handed down to posterity as a hero and a benefactor to the commerce of nations. And all this happened within a space of five years! I think it is almost a record for a man's life.

There is one other name I should like to mention, and that is the name of Alonso Martin. Quintana, a Spanish author of the early middle of last century, has put together the original stories of Nuñez's doings in a very attractive way, and he tells us that when Nuñez and his men reached an eminence—I do not believe it was a peak; I believe it was a saddle, because I do not think Nuñez was a man to climb up a peak unless it were necessary, and if he had to cross a ridge I think he would look for a nice dip in the saddle—but having got there, he halted his men and then walked a little way in advance of them to a height, and got the first view of the Pacific himself. He was silent on that occasion, because the story goes on to tell us that he *signalled* to his men to come up and join him, so he was out of ear-shot. But he told off three of them, of whom Francisco Pizarro was one, Juan Ezgaray was another, and Alonso Martin was the third, to go on ahead down the slope towards this new ocean, and find out the easiest track for the rest of the party, among whom there were several sick, to follow. Of these three men, Alonso Martin was the first to actually reach the shore of the Pacific, and he celebrated the event in a somewhat similar way to Nuñez himself. When he got on to the beach, he pushed off a native canoe until it floated, and then he stepped into it, and sat there contemplating, to await his mates. Having done that, they all went back and informed Nuñez of the route they had followed, and the rest of the men came down. Nuñez de Balboa is said to have waited for the tide to flow, and then to have waded out knee-deep, with his buckler on his shoulder, his drawn sword in one hand, and in the other a banner bearing the figure of the Virgin upon it, with the arms of Castile and of Aragon at her feet; and to have declared the Pacific ocean and all the shores that bound it the possession of the Kings of Spain for ever.

As to the work that has been referred to, that I have been dipping into myself, I may say I began it out of interest in fragments I had read—but which had failed to satisfy me—with reference to certain discoveries in the Eastern Pacific undertaken by the Spaniards in the third quarter of the eighteenth century. I had heard that certain Spanish ships had visited Tahiti about the time Cook was there. I could not find any extensive records of this voyage, and I utilized the time that

happened to be on my hands, during leave of absence from my duties in the Pacific, to visit the immense stores of archives at Seville and Madrid which relate to the history of the "Indies," as they called the Spanish possessions in America. By a series of fortunate, I may really say chances, I by degrees managed to collect all the information I wanted. Originally it was not with the idea of making it known to the world; but, when I found it, it appeared to me so interesting and important in the history of geographical discovery, and, to a certain extent, the anthropology of the Tahitian natives in the early days before they were spoiled by European influences, that I worked it out, and I hope that by the end of this year the Hakluyt Society—which is really Sir Clements Markham, and which has been Sir Clements Markham ever since 1846—will publish it. I believe Sir Clements is the only surviving original founder of the Hakluyt Society; and with him, as it happens, my father was associated in the year I have just mentioned. The only other point I would mention is that it seems a pity we were not able to commemorate this occasion by one other great event that is yet forthcoming—the opening of the Panama canal. It would have been rather interesting if that could have taken place on the four hundredth anniversary of Vasco Nuñez de Balboa's discovery of the Pacific ocean.

Mr. Basil Thomson: It is rather late, perhaps, to go into details that have been raised by this paper, but it was very suggestive to anybody who has lived in the Pacific. The most tragic and the most romantic of all that happened to lost explorers are unknown to us except by native tradition, and when Sir Clements said in his paper that the history of geography was a study that ought to be followed up in the Pacific, I would like to say a word in favour of native tradition. Among those four voyagers mentioned by Sir Clements who tried to get back and never came back, native tradition may help us. Saavedra sailed with three ships. When he was 1000 leagues from New Spain, that is, 200 or 300 miles from Hawaii, the two smaller vessels disappeared in a gale, and about the same time a foreign ship was wrecked among the islands of Hawaii, and two white men survived. According to the native tradition, those two white men are the ancestors of the chiefs of Keei. That calls to my mind another pathetic incident in the history of the discovery of the Pacific. When La Pérouse was lost on Vanikoro, there is no doubt that the greater part of one ship's company was saved, and it is pretty certain when Dillon visited the island in 1826 he was within six months of rescuing one of the survivors. There must have been, throughout the whole history of discovery, many white men who intermarried and left their blood there. We shall never know how they fared and how they were received by the natives. There is another point I want to suggest. I commend it particularly to Mrs. Nuttall and Dr. Corney. Sir Clements mentioned another voyager who never came back—Villalobos. His pilot was Juan Gaetano. Some years ago the Hawaiian Government, in reply to an inquiry, was informed by the Foreign Office in Madrid that in the archives there was a chart giving a fair delineation of the islands, and a note on the chart that they were discovered in the year 1555 by Juan Gaetano. The despatch was numbered 66 of the year 1866. That chart, I suppose, is in existence, and I commend it to Dr. Corney next time he is searching the Colonial records.

I want to say one more word about the Spaniards. I have always felt that a great injustice has been done to them. The Spanish treatment of the natives of the Pacific compares very favourably with what we approve in these days. It is true that they kidnapped natives, but it was not to obtain labourers, but to secure converts. The fact was that religion with the Spaniards was a more active influence in their conduct than we are inclined to believe. There is a very interesting passage in the record of Mendaña's voyage. The Spaniards were hard up for food, and the natives

were all hostile. Mendaña called his chaplain to him, and asked if it was lawful to take food, and the chaplain's advice might have been given last year. It was lawful, he said, to take a moderate quantity of food, but payment must be left for it; but it was also lawful if they were attacked and in danger of their lives, to defend themselves. As long as there was an officer in charge the advice was followed. It was where the rank and file were left without an officer that it was not. That is exactly what would happen now. I think that the Spaniards had every quality in their discoveries but one. They had indomitable courage; they had high enterprise and great ambition; the quality they lacked was discipline. It is characteristic of nearly all the voyages that at some time or other the commander had to deal with mutiny. In these days, when respect for authority and the sense of discipline are everywhere in decay, the history of Spanish discovery and the decay of the Spanish Colonial Empire are subjects for reflection.

The PRESIDENT: I think we may draw to a close, but you will not, I am sure, wish to separate without passing a vote of thanks to Sir Clements Markham, the author of the paper. It is not a bad thing that sometimes we should diverge from the track of contemporary exploration, and in the hands of a competent guide like Sir Clements Markham, should explore the records and hear the achievements of the men of a bygone day.

THE MUFUMBIRO MOUNTAINS.*

By Captain E. M. JACK, R.E.

THE part of Africa which I shall attempt to describe to you to-night is a region of remarkable interest, an interest political, geographical, historical, and romantic.

Politically, this is like the Pamirs, a land "where three empires meet," —namely, the British, German, and Belgian, the frontiers of these three Powers joining each other on the rocky and inaccessible summit of Mount Sabinio.

Geographically, there is first the great volcano range of Mufumbiro, one of the most striking physical features of Africa; and, secondly, the country where many of the ultimate sources of the Nile waters are to be found. The picturesque expression "The land of the Nile Springs," used by Sir Henry Colville as the title of his book, embraces the whole system of lakes and waters which form the fountains of the Nile; but if we trace the sources of supply to their remotest limits, we shall find that many of them have their origin here, or hereabouts.

Lastly, this country has an historical and romantic interest in that this range of volcanoes may possibly be the origin of the old legends of the sources of the Nile. We all know the story of the Nile; how its fountains were said to rise in the Mountains of the Moon, and to flow into some

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* The Geographical results of the work of the British Section of the Anglo-German-Belgian Boundary Commission, 1911. Royal Geographical Society, April 14, 1913. Map, p. 612.

great lakes, and then to form one river. Speke always looked on the Mufumbiro range as the Mountains of the Moon; but, of course, he knew nothing of the existence of Ruwenzori. Since the discovery of Ruwenzori by Stanley, and the great attention drawn by him to that mountain, the tendency has been to look on it as the origin of the legend. It is a matter of academic interest only; but I think that these volcanoes have at least an equal claim to be considered. Ruwenzori is a much larger mass than any mountain of this range taken singly, but it might, by the very reason of its bigness, be missed by the early travellers, as it certainly was by more modern ones. They might see a part and fail to realize the whole. But these volcanoes, if once seen, could not fail to arrest the eye and hold the imagination. They rise with such startling abruptness, and to such a height above neighbouring mountains; they tower above the clouds that cap these mountains; they so eminently fulfil one's childish ideas of what great mountains ought to be.

There are no doubt in Africa, and still more in the world, many larger mountains than these, and many that are more imposing. But few can be, I think, more striking and impressive in their immediate surroundings, or possessed of a more romantic interest. They lie in the very heart of Africa, in what was only a few years ago, darkest and most impenetrable Africa. They are at the ultimate sources of the Nile, that most ancient and most famous of rivers. And they are famed for miles around, as their name implies, as "the place where there is fire," the mountains that belch forth flames and smoke.

Great Britain has had a claim, admitted by other Powers, to this country ever since it was generally known, but she did not effectively occupy it until 1909, when a political mission was sent from Uganda, and finally established itself in the small station of Kigezi. In the negotiations which resulted from this, the boundaries of the territories of the three Powers, Great Britain, Germany, and Belgium, were definitely fixed, and it was to survey and demarcate these that the Boundary Commission, of which we formed a part, was appointed, and was sent to Africa early in 1911.

The country we are considering is divided naturally into certain zones. There is first the volcanic range, with its surrounding lava sheets; then the district of Rukiga, lying north and east of the eastern group of volcanoes; and outside these, on the west, the Ruchuru valley; on the south the country of Ruanda; and on the east the district of Mpororo.

Before dealing with the subject of the volcanoes some mention might be made of the origin and meaning of the name by which they are commonly known, namely, Mufumbiro.* In the neighbourhood we were not able to obtain either Mufumbiro, or any other one place-name, for the range. Indeed, it would have been surprising and most unlike Africa, if we had, as

* Accent mainly on the second syllable. For note as to the meaning and pronunciation of this word see end of paper.

natives are rarely large-minded enough to grasp anything more than their own immediate surroundings. But there seems to be no doubt that the name Mufumbiro is applied to the range by natives living at a distance.

Mufumbiro is a common word in Luganda, meaning "cook" or something akin to cooks and cooking. On my safari it was commonly used when referring to the cook or kitchen. Speke, giving the list of the Uganda Court officials, mentions the "Mfumbiro or cook."

The commonly accepted idea has been that this range has been called Mufumbiro by natives at a distance on account of its propensity for showing fire and its resemblance to a cooking-place; and this seems a reasonable and likely theory. But there is also the possibility that it is merely a corruption of Bufumbira, the name of the district adjoining the eastern volcanoes. Bufumbira is distinctly pronounced by its inhabitants with the accent on the penultimate syllable, and with a final *a*. Such corruption would therefore imply a considerable amount of mispronunciation, but by no means beyond the bounds of possibility with natives, and especially with the Baganda.

Speke unfortunately gives no indication in his writings of where or how he obtained the name. He was the first European to see the mountains, which he did in November, 1861, from Weranhanje, in Karagwe. In the *Journal* he says that he saw "some bold sky scraping cones situated in the country Ruanda"; but he mentions no name. The drawing that he gives of these cones is entitled "View of Mt. Mfumbiro"; and in several other places in the text he speaks of the "Mfumbiro" mountains, but always as if the name were known and accepted.

Stanley, who saw them next in 1876 from nearly the same spot as Speke, is more explicit. In 'Through the Dark Continent,' p. 290, he writes, "About 60 miles off to the north-west rose a colossal sugar-loaf clump of enormous altitude, which I was told was the Ufumbiro mountains." In the text he calls them Ufumbiro, but in the maps in his later books the name is written Mfumbiro.

Stuhlmann is also very clear. In 'Mit Emin ins Herz von Afrika' (published 1893), p. 227, he writes, "Far in the west rises high over the plateau a mighty mountain cup, the much-talked-of Mt. Mfumbiro, as the people of Uganda and Karagwe call it."

Grogan, who passed here in 1899, says (in 'From the Cape to Cairo,' chap. xii.), "Mfumbiro, as a mountain, is unknown to the natives, but I eventually ascertained that it is merely a native word which means 'the place where there is fire' . . . I was informed that Mfumbiro was used by the natives in that part to represent the district of the active volcanoes."

Colonel Bright, on the Anglo-Congolese Boundary Commission, obtained the name Mufumbiro from natives to the north.

On the other hand, Von Götzen says, in 'Durch Afrika' (published 1895), p. 163, "At last we saw the long-looked-for Virunga mountains," and in a footnote, "Hitherto called Mount Mfumbiro, although only

the eastern cone is called Ufumbiro. The Wanyaruanda call them Virunga."

The word Virunga though, to the best of my belief and as far as I was able to ascertain from the natives, simply means "mountains"; the singular form is Kirunga, and is to be found in the names of several of them, as, for example, Kirunga cha Nina Gongo, Kirunga cha Namlagira, etc. It cannot, I think, be correctly regarded as a place-name.

The evidence is therefore, I think, conclusive that the name of this range, as applied by a very large number of natives as a place-name, is Mufumbiro; and the reason for this name is not far to seek, taking it as meaning "the place where there is fire," or "the cooking place," and bearing in mind that these volcanoes are still partially active and emit fire and smoke.

The Mufumbiro range consists of eight mountains and a number of subsidiary cones. All the eight principal mountains have distinctive names, well known to the natives of the surrounding districts. They fall naturally into certain groups.

On the east is a group of three, namely, Muhavura, Mgahinga, and Sabinio. Muhavura, though not the highest peak of the range, is in some respects the most prominent, and is a very well-known mountain. I obtained its name from a native 80 miles to the east, as well as from those in the vicinity. It is a big bare mountain, its sides scantily clothed with a scrubby bush resembling giant heather. Just below its highest point is a depression, now filled with water, and doubtless the remains of the original crater. Sabinio, which I mentioned before as the meeting-place of the three frontiers, is a craggy and inaccessible peak, covered with the densest forest up to about 10,000 feet, above which the bare rocks and precipices stand out. Between these two is Mgahinga, a stunted cone with a large well-formed crater, and like Sabinio covered with dense forest up to its summit. This forest is the haunt of elephant and buffalo.

To the south-west we get another group of three, Visoke, Karisimbi, Mikeno. Visoke is a large and perfect truncated cone. Karisimbi is the highest peak of the range, being 14,780 feet above sea-level. It is a beautifully formed sharp cone, nearly always snow-covered. Mikeno is a curious-looking mountain, being so denuded that it has the appearance of a sharp tooth of rock, with a jagged cleft in it that is very conspicuous from afar.

There is very thick forest round the bases of this group, and up to a great height on the slopes of Karisimbi.

West of these, again, are two isolated mountains, Nina Gongo, or, to give it its full title, "Kirunga cha Nina Gongo," "the mountain of the wife of Gongo," a triple cone thickly forest-clad up to its top, and Namlagira, a huge mass of very recent formation. Namlagira was active as recently as 1907, and about the same time there was a discharge from a vent at the base of Nina Gongo. Near these two volcanoes one can

trace the different flows of lava clearly, their age being indicated by the amount and character of the vegetable growth on them.

The eastern volcanoes are the oldest, Sabinio, Mikeno, and perhaps Muhavura being by their appearance the patriarchs.

All these mountains, with the exception of Sabinio, Mikeno, and, I think, Visoke, have been climbed at one time or another. The Duke of Mecklenburg's Expedition made ascents of several of them, and brought back some beautiful photographs. To our great regret, none of us were able to go up Muhavura. There is no special difficulty in the ascent, but we could not spare the time to wait for a favourable opportunity. Two of us climbed Mgahinga.

These mountains have a profound effect on the native mind, and give rise to many legends. One of these is that Gongo, a demon who inhabits the range, cut off the head of his wife, represented by the mountain Nina Gongo ("the wife of Gongo"),* and threw it into Lake Kivu. This would account for the truncated appearance of the mountain, and possibly for the curious disturbances in the lake, to which I shall refer later.

The country immediately to the north of the eastern group of volcanoes comprises the two districts of Bufumbira and Zomba. This region is an isolated patch, being out of the mountainous district of Rukiga, and being cut off from Ruanda proper by the volcanic ridge. It is a country for the greater part of hard jagged rock, covered with a thick growth of a tall thistle-like bush, which bears a purple flower. Though not possessed of much attraction for the traveller, who has to go through it, this bush gives an effect of great beauty to the plain, especially after the rains, when the brilliant purple reminds one of the stretches of heather in the Highlands of Scotland. At this time also appear a great quantity of yellow and orange flowers which, mingled with the purple, give an extraordinary richness of colouring to the landscape.

This region is covered almost entirely by a sheet of lava which stretches like a sea as far as the mountains of Rukiga. It has decomposed to a large extent into a soil of great fertility, which is closely cultivated by the natives; and in parts, especially near the foot of the mountains, there are great stretches of pasture land affording excellent grazing for large herds of cattle. This lava is honeycombed with holes and caverns which ring hollow under one's feet, and into which probably a great deal of the surface water percolates, accounting for the absence of streams. These caves are put to various uses. One of them was found to be a burying-place, bodies being brought on biers and left there. Another forms a water reservoir, to which cattle are brought from many miles distant in times of drought. Many are used as places of hiding and refuge for men and beasts when alarmed or during raids.

The aspect of this country, more especially the eastern part or Bufumbira,

* I am told that the correct meaning of the word "nina" is "mother," not "wife."—E. M. J.

is most curious, and can be likened to nothing so much as a view of the moon seen through a powerful telescope. It is a mass of craters and volcanic cones, and fantastically shaped hills and hollows. These cones and craters, in the area immediately north-east of Muhavura, have, I think without exception, a steep slope on the south-east side, and a long, gentle slope on the north-west side; arguing the prevalence of a powerful wind from the south-east during the time of their formation. The prevailing wind at the present time is from the south or south-east, but is hardly so constant as might have been expected from the regular formation of these cones. East of Muhavura is an area covered with a mass of huge rocks and boulders piled high one on the other, like *débris* thrown out from some giant brickfield.

The people who live in Bufumbira and Zomba are mainly Batusi, but by no means of pure type. They are both agricultural and pastoral, and keep large herds of the usual long-horned Hima breed of cattle. The most marked characteristic of these people, generally speaking, is a most pronounced and disagreeable smell. All Bahima and Batusi have a smell, which varies in intensity, and is reminiscent of farmyards and cattle and milk. But the inhabitants of Bufumbira defy all competition in this respect, and it is often impossible to allow them to come near. The smell comes from a peculiar and disgusting concoction with which they anoint their bodies, and whose least unpleasant ingredient is, I believe, rancid butter.

In one part we met with some people who, as you will see by the photograph, were refreshingly unsophisticated, and had reduced the dress problem to its simplest expression consistent with decency and a certain amount of elegance.

Rukiga is the name applied to the zone of wild and rugged country lying to the north-east of the volcanic ridge. It consists of an elevated plateau which has been cut by the action of water into a series of long massive ridges which lie mainly in a north-west by south-east direction. As a consequence it will be seen that access to this country from the north-east, that is to say, from the nearest Government station and from Uganda generally, is difficult. The road has to surmount these ridges, and a good deal of climbing is necessary. These ridges have, as a rule, broad-rounded tops; the sides of the valleys are very steep, and at the bottom are the streams and rivers that have cut them out. These streams are often confined to a very narrow bed, and one has no sooner completed an arduous descent than one has to start climbing up again on the other side. In other parts, however, probably where the rocks are softer and sediment has collected, the valleys are broad and their bottoms consist of swamps densely grown with papyrus. This is especially the case on the southern side of Rukiga, where the watercourses develop into marshes that seem to stretch for an interminable length into Ruanda. In wet weather the passage of these swamps is frequently a matter of considerable difficulty. Such path as there is, is formed by cutting down the papyrus and strewing

it across the roadway. If you can preserve your balance on these slippery stalks you get across without loss of dignity; but if you fail, you find yourself perhaps up to the waist in slimy black ooze.

Rukiga was affected to a certain extent by the volcanic activity which took place in its neighbourhood. Traces of old craters were found here and there, and in most of the valleys lava was found in greater or less quantities.

The greater part of Rukiga is covered with longish grass, scrub and bush, with patches of forest here and there. The native villages are usually clustered in the valleys along the edges of the swamps. Paths across the mountains are few and far between, and travelling is as a rule difficult.

The edge of this mountainous country is very distinctly marked on the east and south, where it falls away in a steep escarpment to the open rolling plains of Mpororo and Ruanda. On the west there is also a steep drop to the valley of the Ruchuru, corresponding to the escarpment further north which falls to Lake Edward.

Rukiga is inhabited mainly by Bakiga (which simply means people of Rukiga). These are a race of strongly-built hardy mountaineers of Bantu type. Their dress usually consists of skins, though cloth is becoming more common now; and they arrange their hair in long strings or festoons, ornamented with beads, shells, or cent pieces.

In Rukiga are also found a certain number of Bahutu, who are a Bantu people, and the aboriginal inhabitants of Ruanda; and in the thick bamboo forest near Mabaremere and on the shores of Lake Bunyoni live the Batwa, a race of fierce and savage pigmies. These people live on what animals they can snare or kill, and on the food that they steal from their more peaceful neighbours, whose land they are constantly raiding. The Bakiga hold the Batwa in the most lively dread. The Batwa come, I was told, at night and knock at the door of the hut, and when the door is opened, needless to say by a woman, the women is seized, and the Batwa proceed to plunder the hut, and probably kill the men. When I asked the native who told me this why the men did not fight, he made gestures which I took to mean that they were so paralyzed by fear that they could do nothing.

The only serious trouble experienced with natives was in Rukiga, towards the end of the delimitation of the Anglo-German boundary, when a chieftainess named Mumusa (or Muhumusa) raised the standard of revolt and announced her intention of driving all Europeans out of the country. Mumusa is a well-known person in this part of Africa. She has in past times given a good deal of trouble to the Germans, and she also made herself obnoxious to Colonel Bright's Boundary Commission in 1907. She is what is known as a "witch-doctor," that is, a person regarded by the natives as semi-divine; and she at one time wielded enormous power. On this occasion she collected a considerable following, who looted everywhere and spread great distress among the Bakiga. Captain Reid, who was at the time the

acting Political Officer at Kigezi, arranged to attack her, and as many men as could be spared from the Commission escort were sent to co-operate; but to their great regret were just too late for the fray. Captain Reid's attack was completely successful; he surprised Mumusa, and captured her and many of her retainers, and scattered the remainder. The photographs show what the lady is like. She does not look very formidable, but for a time she was a real danger. She was removed to Entebbe, where she remains in durance more or less vile.

The open undulating country of Ruanda is as different as possible from the highlands of Rukiga. In the place of rugged bush-covered mountains there are wide, grassy plains, affording pasturage for immense herds of cattle owned by the Batusi, and for innumerable head of game. Villages are dotted over this plain, inhabited by the Batusi cattle-owners and their Bahutu serfs, and it may fitly be described as a land flowing with milk and honey.

Ruanda is the country of the Batusi. Much has been written of these people by various travellers and students, and I need only briefly refer to their history here. They are supposed to be of Galla origin, and have, I believe, a vague tradition that they originally came from the north. They are practically identical in features, manners and customs with the Bahima of Ankole, and are no doubt the same people. In appearance the Batusi are a tall, thin, slenderly built race, with aquiline noses and often handsome features. At Niansa, the capital, where the Sultan Msinga has his court, they have probably preserved the characteristics of their race more than elsewhere, and here they wear (perhaps only for gala occasions) a peculiar and distinctive dress, but the curious method of dressing the hair is common all over the country. The Duke of Mecklenburg says that men of from 6 to 7 feet in height are by no means uncommon.

The Batusi are cattle people, solely and entirely. They live for and with their cattle; they know them by name, and treat them as children. To such an extent is this carried, that it is no uncommon thing for a man to recall events by the year in which he had, say, seven children; meaning a son and six calves. The pedigrees of cattle are traced back for many generations. The Batusi do no manual work whatever, with the possible exception of making the vessels in which they carry their milk, but devote themselves to looking after their beasts. Their women, on the other hand, are not allowed to milk or have anything to do with the animals.

The Batusi start herding their cattle from the earliest age, and one may see tiny children, who in England would be still in the nursery, driving and tending these huge long-horned beasts.

The Bahutu in Ruanda occupy to a great extent the position of serfs to the Batusi, and do all the tilling of the ground.

I mentioned that the Mufumbiro region was very interesting as containing many of the head-waters of the Nile, and I propose now to give some account of the water-system of this district.

The Nile as a single river starts, as you know, from Lake Victoria. Of the feeders of that lake the most important in length and volume is the Kagera. This river has its main source in Lake Luhondo, which is a branch of Lake Mwuleru, and connected with it by a waterfall. The Albert lake, which feeds the Nile, gets most of its waters from the Semliki, and hence from Lake Edward, and the principal tributaries to this lake are the Ruchuru, the Ishasha, and the Ntungwe. The Ruchuru issues from Lake Mutanda, under the name of Kako, and falling in a series of huge rapids and falls, finally flows north to the lake. The Ishasha has its origin in the Kiruruma marsh in the Rukiga hills, while the Ntungwe takes its rise a little further north.

Thus it will be seen that these ultimate sources of the Nile, that is to say, those that are most distant from its mouth, originate not far from the Mufumbiro range.

The lakes in this country are Mutanda, mentioned before as the source of the Ruchuru; Mwuleru, in German territory, and the source of the Kagera; the long and irregularly shaped Bunyoni; and the small lakes Muanga, Mugisha, and Chahafi.

Mutanda is a most beautiful lake surrounded by hills, and bearing a striking resemblance, in its colour and surroundings, to a Scotch or Irish loch.

Bunyoni is a wild and lonely lake in the heart of the mountains. Its sides are so precipitous that nothing is seen of it until one gets quite close. Its waters are deep and cold, and its shores are inhabited by wild and truculent natives. Muanga, the little lake near Mutanda, gives rise to the name of the British station Kigezi, which means "the little lake."

A peculiarity of these lakes is that none of them contain any fish. The lower waters of the Ruchuru, the Ishasha, and other rivers are full of fish, so presumably they are cut off from the upper waters by falls and rapids. As a striking contrast to this it may be mentioned that a small lake near Busuenda, near Mount Mikeno, in the drainage area of the Ruchuru, but high above that river, was so full of fish that the water seemed to be alive with them.

Lake Mutanda, it will be seen, though having a considerable outflow in the river Kako or Ruchuru, has no permanent visible inflow. The waters of the Kafuga river and swamp and its connected streams flow into it visibly only occasionally; so that there can be little doubt that the bulk of the supply must find its way into the lake underground. It is probable that there are numerous subterranean channels under the lava crust of this curiously formed country.

The Kiruruma swamp, it will be noticed, lies on the watershed; the Ishasha flowing from it northwards, while another stream issues to the south. This is a curious, but not uncommon feature in Africa.

In the report of the British Mission which visited this country before the advent of the Boundary Commission, a stream called the Zenia was

THE MUFUMBIRO RANGE.

LAKE MUTANDA.

LAKE KIVU.

SWAMP IN RUKIGA.

frequently mentioned as flowing northwards from near Sabinio. I was on the lookout for this stream when travelling from east to west, but all that I was able to find was a deep-stream bed, bearing evidences of having considerable amount of water in it at times, but quite dry when I saw it, although we had been having a good deal of rain. The natives told me that after much rain the stream flowed, and the possibility struck me that there might be some large reservoir in the heart of Sabinio—perhaps the old crater—which filled during the rains and at times overflowed.

I had, in the course of my duties, to pay a visit to Lake Kivu, a lake which lies to the south-west of the Mufumbiro range, and which forms part of another water system, its waters flowing southwards to Tanganyika. The rough path to this lake from the north passes through a belt of dense primeval forest lying between the volcanoes Nina Gongo on the west and the towering peaks Karisimbi and Mikeno on the east. This pass forms the water-parting at this point between the waters of the Nile system and those of Lakes Kivu and Tanganyika. On the southern side a vast sheet of lava slopes down to the lake edge, where it ends with great abruptness, steeply overhanging the water. This lava is covered to a great extent with a scrubby grass and the same tall thistle-like bush that I mentioned as covering the Bufumbira plains; but in many parts large areas of the rock are quite bare with no vestige of soil.

Throughout this lava sheet there are no streams, and I here first learned that human beings can live, if not entirely without water, certainly with very little of it. Natives here live two or three hours' journey from the lake and travel daily to it to get their water. They are even content at times to squeeze from banana stalks the evil-looking and foul-smelling juice that they contain, and which can hardly be dignified with the name of water.

An officer of the mission referred to previously, stated that in consequence of these conditions, the natives were "encrusted with the filth of ages"; but I think that this was an effort of the imagination. The natives appeared to me not markedly different from any others, not particularly clean; on the other hand, not aggressively dirty. I think that most people will agree that the absence of water for washing purposes would never worry the African native much, or materially alter his appearance or condition.

Kivu is held by most travellers who have seen it to be the most beautiful lake in Africa. It is certainly a most delightful spot. It is surrounded by rugged and picturesque mountains, which fall steeply into the lake on the east and west sides; its waters are clear and blue, and the climate is delightfully fresh and invigorating. The northern shore, in consequence of the lava sheet, is inclined to be barren and rocky; though where there is soil it is, as usual in these volcanic regions, very fertile. On the German side, to the east, the richness of the land and the closeness of the cultivation are quite extraordinary.

There is a small Belgian station, Ngoma, close to the German-Belgian frontier, on the northern shore; while half an hour's walk east of it, is the German station, Kisenyi, situated in a very pleasant bay with a sandy foreshore.

A curious phenomenon occurs occasionally on lake Kivu. At a time when there is no wind the surface of the lake will become violently agitated, and the water is found after such agitation to be full of sediment. This disturbance must be caused, presumably, by some submarine volcanic movement.

The Commission had no trained geologist with them, hence a systematic geological survey of the country was impossible. A number of rock specimens were collected, however, and sent home, and were examined and reported upon by Mr. Thomas, of the Geological Survey. A detailed description of these rocks will be found in the official report of the Commission; but the following general remarks may be quoted from Mr. Thomas's report:—

"The structure of the area is probably a mass of unaltered sedimentary rocks resting on a floor of schists and other metamorphic rocks which come to the surface along a north and south line to the west of the district, and appear also from beneath the sediment in the north-east. The volcanic episode is quite a late one . . . and is in all cases probably later than the deposition of the sedimentary series."

The effect of the sheet of lava which covers all the country north of Muhavura and the eastern volcanoes, and through which the hills of sedimentary rock can be seen jutting up like islands, is to deprive this district of streams, as in the case of the lava sheet north of Lake Kivu. The water that comes down from the mountains disappears, to reappear lower down in the form of springs. The natives, who live near the volcanoes, either climb up the mountains for water, or come down to these springs, or to Lake Mutanda, or the other lakes. They have also a certain number of water holes about the plain, but these dry up at times.

The animal life in this country though interesting, did not, as far as the birds and larger mammals are concerned, present any new forms, with possibly one exception. Bird life is very plentiful in all parts except the big forest in Western Rukiga. On the open plains of Bufumbira francolins and quail abounded, and these, with occasional guinea-fowl in Rukiga, formed a welcome addition to the larder.

Of the larger mammals the most interesting are probably the giant forest pig in the Rukiga forest, the situtunga, or Speke's tragelaphus, and the small elephant of the bamboo forest east of Muhavura.

Of the existence of the giant forest pig in the great forest of Western Rukiga no direct evidence was obtained, as only the tracks were seen, but there seemed every probability that this was the same animal as was described by Powell-Cotton.

The situtunga is a rare and interesting antelope, an inhabitant of

swamps, with feet specially fashioned for walking on soft and oozy surfaces. In the remote and lonely marshes of Rukiga it is found in considerable numbers; but, unfortunately, the natives are fond of hunting them, and it is feared that they may be decreasing.

In the bamboo forest near Lake Bunyoni is found a most interesting small elephant. Until this animal has been properly measured and described, it is not possible to state with certainty whether it is a new sub-species, but there are grounds for hoping that it is. On the other hand, it may prove to be the *Elephas africanus pumilus*, which was discovered by Livingstone in 1869, and of which a photograph was recently shown by Sir H. Johnston at the Society's meeting on March 17. This elephant is smaller than the usual African type, a good specimen standing some 8 feet 6 inches high. It carries very small tusks, which appear to be about the same size in the female as in the male. The tusks of a good male weigh about 20 to 25 lbs. Both the feet and ears are smaller in comparison with its size than is the case with the normal African elephant. These elephants are reputed to be very savage.

A specimen of this animal was shot by Captain Prittie and Dr. Marshall, and by their energy the skin and skull are being brought home. Progress in transportation is slow, as may readily be understood, when an unwieldy mass that takes nearly one hundred men to carry it, has to come along a tortuous native path about a foot wide; but as the most difficult part of the journey is over, it is hoped that it will eventually reach the British Museum.

In the forests of Mgahinga (as mentioned before), and others of the volcanoes, there are great numbers of elephant and buffalo (the former of the usual type), and lion were seen on Mgahinga. Elephant and buffalo also inhabit the outskirts of the great Rukiga forest on the Ruchuru side.

In Ruanda and the Ruchuru valley great numbers of African antelope of well-known kinds were seen, namely waterbuck, reedbuck, Uganda kob, and topi, near the Ruchuru; and in Ruanda eland, roan, topi, mpala, oribi, duiker, and reed-buck. There were large herds of Burchell's zebra, usually in company with topi; and a few buffalo were met with. Lion were plentiful in the Ruchuru valley and in Ruanda. Seven were shot by members of the British section, and four by those of the German. A lioness shot by a German officer had a mane, a rather unusual occurrence, I believe. Hyænas and jackals were common, and two small packs of hunting-dogs were seen.

There are a few hippopotami in Lake Mutanda, and two were shot in the river Muvumba; but they are rare in these waters.

With regard to smaller mammals, a large collection was made by Mr. Robin Kemp, collector to the British Museum, who joined the Commission for a time. He trapped and sent home six hundred specimens, among which were six new forms, the most noteworthy being a large tree rat, which has been named after the collector, *Thamnomys kempi*.

Captain Prittie and Dr. Marshall also did a good deal of trapping. They sent home thirty-four small mammals. Among them was a new species of the Murine genus Lophuromys; this mouse has been described under the name of *Lophuromys prittiei*. A rare species of Golden mole (*Amblysomus stuhlmanni*), and many interesting rodents were also represented in the collection.

Dr. Marshall made an extensive collection of flies, ticks, beetles, etc., of which a full report with specimens was sent to the Principal Medical Officer of Uganda.

A good deal of information was gathered together as to the habits and customs of the various peoples met with, and was embodied in the official report of the British Section; but though many of the facts elicited are of interest, it is not claimed that anything of striking novelty was learnt. Among matters connected with their food and eating customs, we found that although in common with other natives of these parts sheep and fowls are kept in large numbers by all the inhabitants of this country, it is difficult to say why this is done, for they neither eat them nor eggs. The eggs are usually kept for the delectation of the Europeans, and are brought to them in all stages of decrepitude.

When an elephant is shot it is generally the custom in Africa for natives to come in from miles around to eat and carry away as much meat as possible. But on the occasion of our shooting an elephant in Rukiga, the neighbouring Bakiga not only refused to eat the meat, but ran away when the skin was cut. This incident may have been local only, and not in accordance with general custom. Part of the elephant was, however, eaten at night, presumably by Batwa.

Drunkenness is very common amongst the Batusi, and especially, I think, in Bufumbira and the adjacent districts. The natives brew an intoxicating drink from Matama flour, at the gathering in of the harvest, and wild scenes of debauchery prevail. It is a common thing to see drunken men at any hour of the day or time of year.

The religion of these people, if such beliefs as they have can be dignified by such a term, is of a vague and rudimentary description, and takes the form of Lubare or Nabingwe worship. Lubare is the common worship of Buganda, and is the belief in a spirit living in some selected object, such as a tree or stone, or very commonly in a python. In the latter case the snake is enticed with milk and food to remain near the villages, and girls are ordered to attend to its wants.

Nabingwe is a female spirit, who lives underground, but often appears among human beings, rapidly assuming various personalities, such as a child, old woman, etc., but always feminine. The spirit is usually malignant, and causes death, illness, etc. One of our party suffered from a series of sores on the legs, which we were told by the natives was the result of expressing doubts as to her existence. Large huts are built in honour of Nabingwe, in the outer compartment of which live four or five

priests and priestesses, and in the inner a bed is made and food placed for her convenience. The duty of the priests and priestesses is to receive the personal instructions of Nabingwe, and then to inform the laity of her wishes. The divine will often expresses in this way the desire for a cow, which is then killed and eaten by those acting as her mouthpiece.

There is a belief amongst these natives in the return of the spirit after death. No steps appear to be taken either to prevent or encourage this; but miniature huts, with food placed inside, are frequently seen outside the natives' huts, and these are said to be for the spirits of the departed.

The Batusi, as has been said, live for their cattle alone and do not barter or sell them. Among the Bahutu and Bakiga the only industries appear to be the manufacture of iron implements—spear heads, knives, hoes, and axes—from the soft iron ore which is commonly found in the hills; of wicker baskets, used for carrying and storing food, and of earthenware pots.

The method of smelting iron is to place the ore in a kiln with a quantity of charcoal; the draught being obtained by pots, shaped like kettles, with their spouts projecting into the kiln, and their tops covered with a skin. A long stick is attached to the middle of this skin, and by moving it quickly up and down a current of air is induced in the fire. The photograph shows a fairly large kiln in operation.

The blacksmith's hammer is rather a curious implement. It has no handle as we understand it, but consists of a lump of iron, shaped like a huge carrot. The blacksmith holds it by the thinner end. All work is done squatting on the ground with a large stone as anvil. Considering the rudeness of the implements the work they turn out is excellent.

The Batusi use, and presumably make, finely made wooden pots for carrying their milk, in contra-distinction to the Bahima of Ankole, who use earthern pots as a rule.

Some interest may naturally be taken in the question of the future of this country, and its place in the economic development of the Uganda Protectorate.

Enough has been said, I think, to show that Rukiga is not an easy country for communication. For this reason alone I am personally glad that it has come under British rule, as that is, I hope, a guarantee that physical difficulties will not be allowed to stand in the way of good administration. The Bakiga are, I believe, not a bad people. Hardy and strong, they are probably a more virile race than those in the plains. Rukiga was once more thickly populated than it is at present, as evidenced by the numerous traces of its cultivation in many valleys. We were told that a bad famine some years since accounted for this; but I think raiding and fighting have also had something to do with it. With a good administration, which the country has never yet had, it is probable that its prosperity will be renewed, and in fact, even in the short time since we occupied it, evidences were seen that natives were returning.

It is improbable that Rukiga can ever be much more than an agricultural country. A certain number of cattle were, however, found in the hills, and some trade in agricultural produce and in hides may be developed with Ankole.

The same remark would apply to Bufumbira. Here there are many more cattle, but this does not mean much, as the Batusi, like the Bahima, can never be induced to trade in these animals.

The only regular trade that we discovered was between these regions and Ruanda and the Katwe salt lake. The route (a well-worn and much-used one) passes to the east of Muhavura and then westwards to the Ruchuru valley. Large herds of sheep and goats are constantly being brought along this road, and are bartered, usually at some meeting-place in the Ruchuru valley, for the much-desired Katwe salt. We were told that one goat would buy a packet of salt with which on the return to Ruanda two goats could be purchased, so that the trade would appear to be a lucrative one.

With regard to Mpororo, which lies east of Rukiga, this, I believe, was formerly a part of Ankole, and it is proper that it should now return to it. It is a cattle country only, possessing huge pastures and hardly any trees.

Considering the use of the country to Europeans, there is in the first place the climate, which is undoubtedly healthy and invigorating. At our Lake Mutanda camp the average temperature from March to July was 64° F. (varying between extremes of 55° and 74°). The altitude here is about 6000 feet. In the Rukiga hills, which go up to 8000 and over, we suffered more from cold than from heat. Throughout the high country there is no malaria, Malta or Spirillum fever, and sleeping sickness is unknown. As the *Glossina palpalis*, the fly which carries sleeping sickness, was found only in the lower reaches of the Ishasha, it is unlikely that this dread disease will penetrate into this region. There were practically no mosquitoes of any kind.

It would, therefore, appear to be a district eminently suitable for Europeans, and so in many ways it is.

The disadvantages are, first the difficulty of access, which is certainly a serious bar; and, in Bufumbira, the general rockiness of the ground, which is bad for walking and riding. It may be added that there is not much sport. Except the big game in the mountain fastnesses and the bamboo forest, there is only some partridge shooting to be had, and occasional duck in the lakes. There is not enough of the kind of occupation that the average Britisher likes to make the place very attractive to him for a long stay.

On the other hand, the climate would prove a certain pick-me-up to any one who had been suffering from malaria or other fever, and any one who was fond of geology or botany would find that there was a large field here for his energies, in a country, not only of remarkable beauty, but

which had, I believe, for all of us who worked there, an undeniable charm and fascination.

The British triangulation was based on the side Ihunga-Chamiumbu. As this side is also common to the surveys of the Anglo-German and Anglo-Belgian Boundary Commissions (of 1903 and 1907–8) the topographical work throughout this part is thoroughly well connected.

This survey was in an exceptionally favourable position for determining the positions and heights of all the volcanoes, and full advantage was taken of this. A large number of observations for altitude were taken to the volcanoes from stations around, and it is believed that the heights of these mountains are now known to within ± 20 feet at the outside (in the case of the three eastern mountains probably ± 10 feet).

The heights obtained are given below, the results being the weighted means of the determinations by the present Survey, by the Anglo-Belgian Boundary Commission (1907), and by Captain Behrens (1903), paying due regard to the numbers of observations made and the lengths of the rays to the peaks (for full account see official report).

	Feet.		Feet.
Muhavura	13,547	Karisimbi	14,780
Mgahinga	11,400	Mikeno	14,540
Sabinio	11,960	Nina Gongo	11,386
Visoke	12,175	Namlagira...	10,046

Note on the Name Mufumbiro.

The Rev. H. E. Maddox, a recognized authority on the languages of the Uganda Protectorate, has kindly given me the following note on this name:—

"The word 'Mufumbiro' seems to be due to the Baganda. The word in their language actually means a cook. . . . I should guess that the Baganda got the idea of the verb *oku-fumba*, 'to cook,' from the district Bufumbira, and deliberately altered it to Mufumbiro to provide a name for the mountain. Perhaps they did actually call it in fun 'the cook,' omu-fumbiro; but this could not survive as a proper name without losing its initial vowel. . . . The Baganda are exceedingly fond of giving nicknames.

"The accentuation of four-syllable words in Luganda is interesting and a little difficult. These words have three accents: (1) A primary stress accent on the first syllable; (2) a secondary stress accent on the third syllable; (3) a pitch accent on the second syllable. The pitch accent is unusual, and claims so much attention that people are inclined to think it should be pronounced Mufúmbiro, and English people generally do so. The secondary stress accent is of course weak, but it ought not to be neglected."

(For practical purposes a near approach to the correct pronunciation would probably be to lay almost equal stress on the first three syllables, but giving the second slightly more emphasis.—E. M. J.)

Major Leonard Darwin, Vice-President in the Chair (before the paper): Captain Jack, who has kindly consented to lecture to us to-night, has had wide experience in all questions connected with surveying, more especially in those regions of Africa about which he is going to speak to us to-night. He went out under Major Bright,

in the year 1907, on the Anglo-Congolese Boundary Commission, and, after that was over, he stayed on in connection with the survey of the 30th meridian of latitude. Later on he again went out as chief British Commissioner to the Anglo-German-Belgian Boundary Commission. I believe this is the only known case of a boundary commission where three great Powers have joined together to simultaneously delimit the boundaries where their frontiers met. This work led him into certain very interesting and remote regions of Uganda, to the most out-of-the-way part of the whole Protectorate.

Major DARWIN (after the paper): I think Captain Jack, in his paper he has just read to us, was wise in giving us a general and broad description rather than giving a detailed account of his work, either on the boundary commission or of his later survey work in Uganda. I want, however, to make it quite clear that we highly appreciate the admirable work which he did in this district of Africa in surveying the land, the results of which are seen in the map which you have in your hands. A general description is what we want, because it indicates the nature of the problems which have to be solved by those who go to this country at a later date. I was very much struck by his observation on the shape of these volcanic cones. He showed us how the small cones showed the direction of the wind by falling over, as it were, to one side, whilst the large cones showed no such shaping by the wind. I do not know why that is, and I do not know why all volcanic cones do not show the effect of the wind in the way seen in these smaller cones. Altogether, I think his description and his map will form a most valuable addition to the knowledge of that region, both for the traveller and also for Government officials.

Sir ALFRED SHARPE: I have listened with very great interest to Captain Jack's paper, because Mr. Mountstuart Elphinstone and myself returned from the Kivu districts only a month ago, and I can most thoroughly endorse what Captain Jack said as to the Kivu districts being "romantic." The scenery is charming and the climate is delightful. With regard to "Mufumbiro." We did not hear this name ourselves, but we were not on the north-east of Kivu. What we heard at the north end was that all the volcanoes were called by the general word "Kirunga," and we came to the conclusion that this meant, not a mountain generally, but a volcano. We were fortunate on our visit, inasmuch as we came in for a tremendous volcanic eruption. It began ten days before we reached the north end of Lake Kivu, and continued for a little more than a month. It was not an old volcano, but an entirely new one, which commenced with an earthquake (we were told), after which a crater opened in the bare plain. When we arrived—ten days after it started—there was a crater 600 yards in diameter, and a cone 500 to 600 feet high had already been formed. The north-west corner of Kivu was more or less boiling water, as a large river of lava was pouring in, there was also an incessant fall of ashes and stones. The prevailing wind, as Captain Jack said, is east and south-east, and this was proved in the case of this eruption; the ashes were all carried to the west. East of the volcano, the stations of Goma and Kissenje, which are within a few miles, did not suffer; but west, as far as the settlement of Walikali, the whole country was destroyed. Walikali is 240 kilometres west of the new volcano. Captain Jack spoke of Ruanda. It is, as he said, a beautiful country. I was told that the German authorities had recently completed a census of cattle in the Ruanda district, and that they had arrived at the gigantic total of $2\frac{1}{2}$ million head. In addition to this, south of Ruanda, is the Urundi district, which is as large and as full of cattle as Ruanda, and on the west there is the Belgian territory. Probably around Lake Kivu there are not less than six million head of cattle. The western half of the Rift valley is one vast lavafield from Kivu to

within about 30 miles of the shores of Lake Edward. We formed the opinion that what is now the south end of Lake Kivu was originally the watershed between the Nile and Lake Tanganyika, and that the whole of what is now Kivu was a valley which ran down to Lake Edward, but that volcanic action has thrown up a barrier across the Rift valley, and thus formed Lake Kivu, which now flows out at the south end.

Colonel C. F. Close: I shall only say a few words about this subject; but I think I ought to begin by saying Captain Jack has given us a very good paper. I have not often listened to a paper which interested me so much. The delimitation which Captain Jack has described is a portion of the great settlement of the eastern frontiers of the Congo. This settlement, which was arrived at after a good deal of difficulty and involved negotiations spread over three years, stretches from the north end of Lake Albert, through Ruwenzori, through Lake Edward, through the range we have just been listening to a description of (the Mufumbiro range), down Lake Kivu, and then to the north end of Tanganyika; so that you will see the arrangements involved many troublesome questions. Two of these were exceptionally difficult. One was the position of the Mufumbiro mountains. Some people went so far as to deny that there were any mountains called Mufumbiro. Fortunately, the evidence was conclusive that there were, and that Speke saw these mountains. It is a matter of regret that Speke never knew that his chance glimpse of this magnificent volcanic range has, as a fact, resulted in a great portion of these mountains and the region north of them becoming British territory. The second troublesome question was the question of the 30th meridian east of Greenwich. The 30th meridian was a wandering meridian. Nobody knew exactly where it was; it was not quite certain until definite observations were taken whether it cut Lake Edward or not, and I can only say that there is no more troublesome geographical problem than to have a meridian which wanders about over the face of Africa. That question and other like questions were settled by a series of officers—Colonel Delmé-Radcliffe, Major Bright, Captain Jack, Captain Behrens, Captain Prittie, and others—who have been out there, and it is, I think, chiefly due to Colonel Delmé-Radcliffe and Major Bright that this question of the Mufumbiro region was brought up for decision. It took a long time to deal with, but finally it was settled, and it is a matter of great gratification to realize that this valuable portion of Africa is now a valuable portion of the British Empire.

Major Bright: It has been my good fortune to work with Captain Jack in Africa on a previous frontier commission. He has made no mention of the various difficulties he must have successfully surmounted in carrying to a rapid conclusion an arduous piece of work, such as the expedition he has described to us.

The results of Captain Jack's and Captain Prittie's expedition will be more definite than is usual from boundary commissions. For some years the country which he has described has been claimed not only by our Government, but also by the Germans and Belgians. In places there have been German and Congolese forts close to each other, and situated in the same native districts.

In other parts the British and Congolese authorities have agreed, pending the final settlement, to perform no act of occupation. Under these circumstances the state of the country and the condition of the natives, in their somewhat bewildering political surroundings, left much to be desired. Captain Jack and his brother officers, working in cordial co-operation with their German and Belgian colleagues, have settled on the spot all these outstanding questions.

In conclusion, I heartily congratulate him, not only on his lecture this evening, but also more especially on his successful and practical solution of a perplexing international problem.

Major DARWIN: There are two names I ought to have mentioned—Captain Prittie, who was the assistant commissioner, and Dr. Marshall, medical officer of the expedition. I am quite sure Captain Jack would wish those names mentioned in connection with his. In bringing this meeting to a close, I am quite sure I may associate these names with the name of Captain Jack when according him a hearty thanks.

THE AUSTRALIAN ANTARCTIC EXPEDITION.

Report by Captain J. K. DAVIS.

THE *Aurora* left Hobart on December 26, 1912, for Adelie Land, and encountered a good deal of heavy weather. We arrived in the vicinity of the ice barrier we had sheltered under on our previous voyage on January 11, 1913. This barrier was found to have disappeared, and we proceeded south over its former position. The following day we encountered heavy pack ice, which, however, we managed to push through without much delay, and on January 12, at 2 a.m., dropped anchor in Commonwealth bay. It was blowing a fresh gale, and we were unable to communicate with the shore until the afternoon; on doing so we found the party at the hut all well, and three sledging parties out, whose return was expected by January 15.

We learnt that Commonwealth bay had proved to be a terribly windy place, and that during the winter months it blew a constant gale. The average velocity of the wind for the year, we were informed, was 50 miles an hour. By January 18 two of the sledging parties had returned, and we now awaited the arrival of the remaining party under the leader of the expedition. On January 23, a party was despatched to the Five Mile camp to look out for signs of the returning party. On January 25, a fully-equipped relief party left winter quarters to make a thorough search for signs of the missing party, whose non-return had given rise to grave anxiety.

A provisional relief party was now appointed to remain at winter quarters if necessary for another year, under the leadership of Mr. C. Madigan, consisting of Messrs. Bage, Bickerton, Hodgeman, Jefferies, and Dr. Maclean. Stores, coal, and equipment were landed as opportunity offered in the violent weather we experienced after January 20. The wireless mast was lengthened and re-stayed. I had instructed the relief party that it was urgent that the *Aurora* should proceed to Mr. Wild's base on February 1, as the lengthening nights would make our voyage south from Termination barrier one of great difficulty on account of the enormous masses of ice which collect in this region.

The weather in Commonwealth bay was steadily growing worse, and by January 27 we had lost our three anchors and parted our cable twice. No sign of the missing party having been seen at 6 p.m. on January 29, the weather being clear, the *Aurora* proceeded eastward along the coast

looking for any sign of the party. Nothing was to be seen of any flag or depôt, and on the night of January 30 we were stopped by heavy pack-ice, and returned to winter quarters the following night. There as usual we found it blowing hard, and steamed about waiting for it to moderate sufficiently to send a boat ashore to pick up the eleven members of the expedition who were returning with us. Instead of moderating, however, it freshened up, and for the following seven days blew a very heavy gale. During this period I do not think the velocity of the wind was ever below 40 miles an hour, and frequent squalls were recorded by the anemometer on shore as 80 miles an hour. For the whole of this seven days we maintained a constant struggle to keep the shelter of the shore. This by driving the vessel at full speed we were able to do, although during the squalls we were frequently blown well out of the bay. The growing length of the darkness and numerous reefs and grounded bergs made it evident that unless we could maintain our position the situation would be a very serious one. The gale continued without a lull until February 8, by which time all hands were exhausted and the vessel covered with ice, and our likelihood of being able to reach the second base this year looked doubtful.

On February 8 at daylight the wind suddenly moderated, and at 10 a.m. full calm. We immediately steamed inshore and picked up the returning party consisting of Messrs. Murphy, Stillwell, Hannam, Close, Hunter, Laseron, Whetter, Hurley, Webb, and Correll. We received the report of the search party, said good-bye to the relief party, and started on our voyage west. I was already ten days later than I considered prudent. We had 1500 miles of ice-strewn water to traverse at what in these latitudes—64° S. to 66° S.—is late in the season, the duration of which is controlled, not by the temperature, but by the increasing length of the nights. I knew that unless we could arrive at the second base before February 20, our getting in at all past Termination barrier would be an extremely difficult matter, as the sea from here for 180 miles south is just a sea of bergs and heavy floes. At 8.30 p.m. the same evening, when we were about 50 miles distant from the main base and were approaching heavy pack, Mr. Hannam received a wireless message on board the vessel informing us that Dr. Mawson had arrived at the hut, and that his two companions, Dr. Xavier Mertz, of Switzerland, and Lieut. B. E. S. Ninnis, Royal Fusiliers, London, had perished, and instructing me to return and pick up all hands. We immediately turned round and steered back again, hoping that the fine weather would last long enough to enable us to pick up the party. At 8 a.m. on February 9, when we were approaching the base, the wind had freshened to a gale again and showed signs of getting worse. At noon we stood right up to the ice face to see if it were possible to send a boat ashore, but the wind was too violent, the vessel herself only just steering. I then signalled for instructions, but although these signals were observed, we could get no answer. We then stood on and off hoping

that the wind would moderate. At 6 p.m. it was evident that the weather was getting steadily worse with a falling barometer.

I felt it was necessary to decide whether I was justified in remaining any longer trying to pick up a party who were in safety and fully provisioned and equipped in every way for a second year, or whether I was not bound to proceed westward without further delay to the relief of the party under Mr. Wild, whose position on a floating barrier was such that it seemed absolutely imperative that we should reach them this year. It was a difficult position, but after careful consideration, I decided to proceed west for the following reasons:—

1. The party at the main base were in perfect safety and fully equipped in every way for a second winter.

2. The short summer season at Adelie Land was evidently over, the violent weather having apparently set in with falling temperatures, the gales often lasted for a week without cessation, as we were able to see from the previous year's records.

3. The further detention of the vessel was seriously endangering our chance of being able to relieve Mr. Wild's base this year, to reach which we had to traverse a distance of 1500 miles, the navigation of which distance was rendered extremely difficult on account of constant snowstorms and growing darkness.

4. The only other vessel which had penetrated south in this region, *The Gauss*, had been frozen in on February 22. The *Aurora* was not provisioned for a winter in the ice, as we had landed most of our spare stores for the relief party at the main base.

5. As a seaman, knowing the difficulties that we encountered both in getting to and getting away from the second base the previous year, I felt that nothing could exonerate me from blame if we further delayed our departure, and that, being unable to communicate with Dr. Mawson, it was clearly my duty to act as I was convinced he would wish me to do were I able to make him acquainted with the situation of the western party.

At 6.30 p.m. on February 9, I gave orders for our departure. As we left Commonwealth bay and got away from the snow slopes the weather again improved. We met the pack ice the following day, and after a very trying morning got through the heaviest of it and continued our course in fairly open water. For the next three days we encountered fresh westerly winds, and were making little more than 60 miles a day to the westward. Our chances of getting to the second base party were looking gloomy, when an easterly gale burst upon us which soon developed into a heavy blizzard. This lasted three days, and we drove west before it under steam and sail at times unable to see a length ahead of the vessel. There was no alternative, however, if we were to get west in time, but to keep going. As daylight came in each morning we could feel thankful that another night (which now lasted five hours) had passed without disaster.

We made good progress until February 18, when icebergs became very

numerous, and on the 19th, at 8.30 a.m., were brought up by a heavy pack extending right across our course. We were at this time about 90 miles from the northern point of Termination barrier, and had found open water right up to this barrier on our previous voyage. There was nothing to be done but to follow the pack to the northward, and this we had to do for 80 miles before being able to steer west again. The position of the pack was a terrible disappointment, it appeared unlikely that we should be able to penetrate to the second base at all. Countless numbers of bergs made navigation after dark a matter of great difficulty, and the easterly wind which generally freshened at sunset brought snow as a rule. The following afternoon we were in the longitude of Termination barrier, but 20 miles of close pack separated us from it. We tried to push south through this, but after a couple of hours it was evident that progress in this direction was impossible. Anxious to retain our freedom of action, I decided to come further west before pushing into the pack, and on February 21, at noon, finding the ice looser, pushed south into it. We were able to get through here without much difficulty, and at noon the following day had pushed through 80 miles, which were fortunately separated by wide leads of open water, and reached a sea of bergs which constitute the chief danger to navigation in this region, as they are so numerous as only to be avoided with difficulty in clear weather.

The wind was rapidly growing to a blizzard, and a short confused sea rendered our position one of much anxiety. At 8 p.m. the darkness and snow rendered it impossible to see any distance. The night that followed was one of the worst I have experienced. Soon after 4 a.m. the Shackleton glacier was sighted to windward, and on the weather clearing we were able to see that we had reached much clearer waters. At noon, February 23, we were approaching the second base, and made fast to the floe ice at 12.30. There we found all hands safe and well. The work of transferring stores and watering ship began at once. No one required any urging to hasten; the last four days had made it evident that if we were to get out this year in safety it would have to be before the next blizzard. By 9 p.m. on this day (February 23) all specimens and most of the stores were on board, and the fresh-water tanks filled. As I wished to spend the night steaming north under shelter of the glacier, we now got under way and were favoured with fine clear weather. The following day we were travelling the sea of bergs again, but this time in fine weather. For nearly 400 miles we made north amongst great numbers of bergs and floes. It appeared astonishing how we could have escaped running into them during our last blizzard. We did not get out of the icebergs until north of the 60th parallel. There appears to be some current or meeting of currents which collects the ice in this locality, as I have seen nothing like it in any other part of the Antarctic. The last icebergs were sighted in 55½° S., and the *Aurora* continued her voyage towards Hobart before strong westerly gales and high seas, arriving there on March 15.

JUBALAND AND ITS INHABITANTS.

By F. ELLIOTT, A.S.P.

The north-western boundary of Jubaland is a line drawn from the Lorian swamp, passing through the districts of Wajheir and Eil Wak, and terminating at Dolo, on the river Juba. Its south-eastern boundary is the Indian ocean. Its eastern boundary is the river Juba, whose eastern bank is within the Italian sphere of influence. The western boundary is an imaginary line from the Lorian swamp to the Barjun settlement of Kiunga on the coast. Off the coast is a series of coral reefs and small islands, partly inhabited, which makes the approach by vessels somewhat difficult.

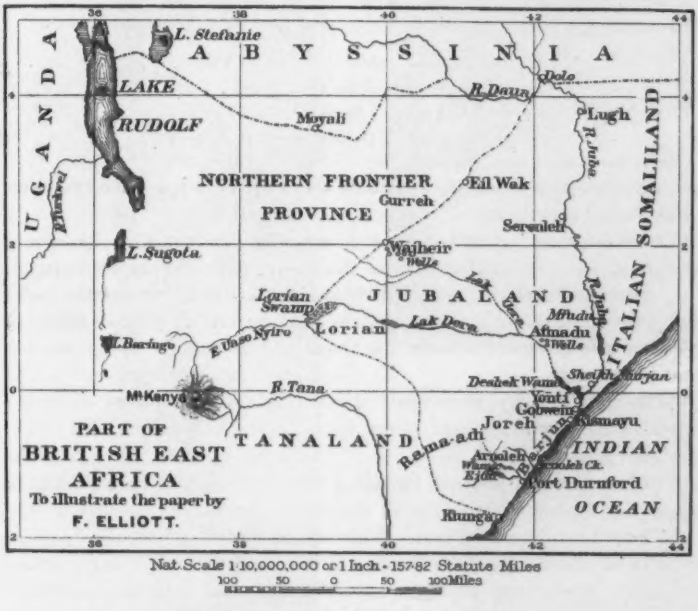
The available harbours are two in number, Kismayu and Port Durnford; the latter can only be entered by vessels of light draught. The mouth of the river Juba is blocked by a sand-bar, which can be crossed by vessels not requiring more than 6 feet of water. There is, in addition, the large creek of Arnoleh (place of milk), which is navigable by dhows, and extends some 20 miles inland. Along the shore there is a line of sandhills stretching inland for about a mile. Their heights average not more than 200 feet, and they are clothed with bush and mimosa thorn.

Immediately behind the sandhills lies a flat country, thick with thorn and other bushes, but which possesses here and there open or park-like plains whereon cattle, camels and goats are pastured. As we proceed north-westward the belts of bush become denser and more difficult to penetrate, while in the more southern districts the open plains are larger and more numerous.

The general view of the country is uninteresting from lack of hills, and depressing from want of variety; yet it possesses great possibilities as a grazing country.

Along the whole of the western bank of the river Juba lies a belt of what is called "black-cotton" soil, the fertility of which, under irrigation, may be compared to that of the Nile valley. It is already producing crops of cotton equal to the best Egyptian, and in the future might become a district of considerable commercial importance. The Juba, locally called the Webbe Ganana, rises in the mountains of southern Abyssinia. Its course is southward, but it winds in many directions. Its only tributary in Jubaland is the Daua. The local drainage is very small, and there are numerous swamps on either bank. The river is lowest from December to March, it then rises slowly until May. After this month the river again falls, and this fall is followed by its greatest rise, which occurs between August and November. The banks are well defined and clothed with vegetation and bush. The swamps lie beyond these banks. The river is navigable all the year round to Yonti. During the floods steamers can even reach Serenleh. The tsetse fly haunts the banks and swamps.

The Lorian swamp in the north-west corner of the country is in the rainy season for the most part a morass with a circumference of about 60 to 70 miles, but having moderately deep pools of water surrounded by reeds. In the dry season it is a mud flat with a permanent supply of water in its midst. This swamp is supplied from the slopes of the Aberdare mountains and Mount Kenya with water which enters it by the E. Uaso Nyiro river. There is a clearly defined river-bed, called the Lak Dera, connecting the Lorian swamp with the Wama lake. This river-bed is now dry, but the natives report that water has been known to flow down



it as far as Afmadu (black mouth), which is a district about 30 miles from the river Juba.

The general direction of the above-mentioned Lak Dera (long stream) is east until it reaches the Afmadu district, where it is joined by the Lak Jera river-bed, and this has a stream of water during the season of heavy rains. After passing Afmadu the united river-bed turns almost due south until it reaches the Deshek Wama (Wama lake), a lake which formerly had permanent water extending 16 miles in length by about 2 miles in breadth. This lake was formerly fed by a stream proceeding from the river Juba at a point about 50 miles from its mouth, and it was drained by another stream entering the Juba 20 miles from its mouth, near the town of Yonti (noisy place).

The feeding stream has been lately blocked by an artificial bank, and the lake is now dry except in the rainy season.

Towards the south-west of Jubaland exists a plateau of slight elevation. From this in the rainy season a considerable amount of water flows into a series of swamps, drained by two creeks entering the sea by a common mouth at Port Durnford. These swamps are called by the general name of Wama Eidu.

The climate in general is healthy even for Europeans, for although the heat is often intense, it is a dry heat very different to that of places to the south. The average coastal temperature is 80°, but inland it is greater. The seasons are as follows:—

Gu, The heavy rains (March to July).
Hagar, Dry season (July to August).
Dair, Lesser rains (September to November).
Dirar, Dry season (December to February).

The two dry seasons are sometimes also called Jilal, and the two rainy seasons Barwargo.

The rains fall inland first, and are often accompanied by severe thunderstorms. On the coast the rainfall is less than in the interior. The two monsoons are equally divided into periods of six months each; the south-west, blowing from April to August; and the north-east from September to March. Between the two monsoons comes a calm, when the heat is excessive.

The country may be roughly divided into the following districts: Rama-adi, Barjun, Kismayu, Juba river, Afmadu, Serenleh, Eil Wak, Wajheir, Lorian.

The district of Rama-adi, including the sub-district of Joreh, contains a group of flat-topped low hills on which a fairly plentiful quantity of rain usually falls during the year. This water, draining into the swamps mentioned above, causes the country to possess valuable feeding-grounds for cattle. Port Durnford is the natural harbour for this district, but at present the trade is undeveloped. Much valuable wild-vine rubber could be obtained from this neighbourhood, but the trade is hindered because the Somali, who dominate the country, are too supine to gather the rubber, and will not suffer the coast tribes, who are not Somali, to collect it.

Three sub-tribes of the Ogaden Somali dominate the Rama-adi district, namely, the Abd Wak, the Magharbul, and the Abdullah. They possess large herds of cattle, but they do not breed camels.

The Barjun district consists of Port Durnford, the sub-district of Arnoleh, and a series of small islands adjacent to the coast. The natives include the Barjun, the Boni, and the Gala tribes.

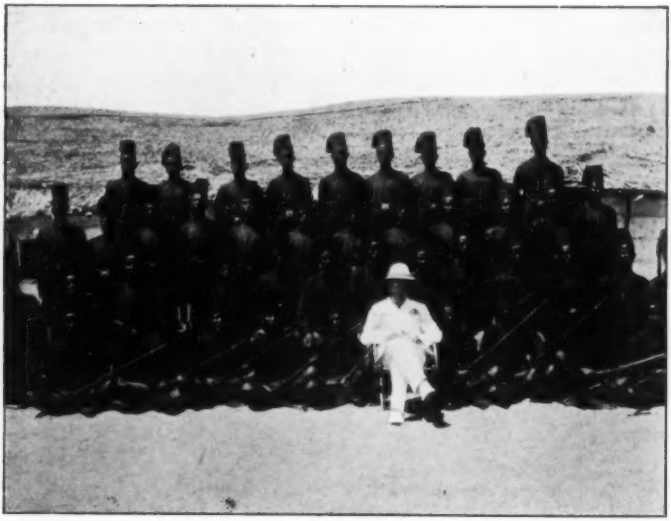
The Barjun are a race quite distinct from the Somali, and they have their own language and customs. Their local name is Wa-Tikuu. They obtain a living by fishing and marine trading. They claim to be descended

KISMAYU, SHOWING SANDHILLS.

BRIDGE OF CREEPING VINES MADE BY THE WA GOSHA.

BONI VILLAGE.

THE RAW SOMALI.



THE TRAINED SOMALI.

from Persian settlers; this is corroborated by the existence in their district of ruined stone houses of distinctly Persian architecture, and also by their light complexion and regular features.

The Boni tribe formerly lived in the Gurreh country on the borders of Abyssinia, where their sole occupation was that of hunting. Gradually they spread southward until they reached that part of Jubaland then inhabited by the Gala, who are locally termed the Wurday. With this tribe they made an agreement that they should be allowed to live and hunt in the districts of Afmadu and Deshek Wama, under condition that one tusk of every elephant killed should be handed to the Gala.

When the Somali and the Gala began fighting the Boni were neutral, but when the former proved victorious the Boni retired into the thick bush, where for two years they lived on game. Subsequently they made with the Ogaden Somali a similar arrangement to that which they had formerly made with the Gala, and this arrangement is still carried out. They now have settlements in Arnoleh and the hinterland of Port Durnford. In physique they are in no respect like negroes. Oppressed and persecuted by the young Somali, they have become extremely timid and shy of strangers. If a traveller approaches one of their villages, the whole population takes refuge in the thorn bush, where it is quite impossible to track them. Their weapons are bows with poisoned arrows. This poison they obtain from a scarce tree called Wabaiyu, which is a species of Euphorbia. Of late years this tribe has begun to collect the wild rubber around Arnoleh and to barter it with the Barjun in exchange for cloth. In hunting they have remarkable skill, and their knowledge of the bush is wonderful. When water fails them in the bush they watch the birds, and when they see the birds sitting on yak trees in any numbers, their experience tells them that water will probably be found in the hollows of some of the trees.

These yak trees have thick stunted trunks in which large cavities are often to be found. The branches of the trees spring from the circle of living wood round the cavities.

The marriage customs of the Boni are very simple. When a young man wants a wife he goes hunting until he kills an elephant, of which the one tusk is for his Somali superior and the other he exchanges for cloth. The cloth is given to the girl's father, and if it is sufficient in quantity she becomes his wife.

In intelligence the Boni are superior to the Barjun, but not equal to the Gala or the Somali. Their language, which is at present unwritten, somewhat resembles that of the Somali, yet the difference is too great for mutual understanding.

It is noteworthy that a small settlement of Boni, living on the banks of the Juba, have begun to cultivate maize. It is difficult to estimate the number of Boni now living in Jubaland, but probably they do not exceed a thousand. This interesting tribe, who may possibly be the

aborigines of the country, are rapidly decreasing in numbers, and in a few years will probably be extinct or merged among the Somali, whose missionaries are busily employed in converting them from Paganism to Mohammedanism.

At Arnoleh is the only settlement of the Gala tribe in Jubaland, though they are to be found scattered among the Somali throughout the whole country. Monseigneur Taruin Cahaigne, of Harrur in Abyssinia, has suggested, according to Colonel Swayne, that this tribe had their original local habitation in Tanaland. It would appear more probable, from inquiries made from the Gala themselves, that their tribe came from the north of Italian Somaliland, whence they were driven by the more powerful Somali; and that they first took refuge in Jubaland and afterwards in Tanaland, where a large settlement of them still exists.

Northern Somaliland can show many cairns of Gala origin, but in Jubaland I have found not one. It appears that, after being driven across the Juba by the Somali, the Gala took possession of the country to the west of that river. About 1842 the Somali crossed the Juba, attacked the Gala, and were defeated with great loss. These attacks were continued until 1845, when the Somali offered peace on condition that they should be allowed to inhabit Jubaland side by side with the Gala. The Gala foolishly consented to this. In 1848 the Somali treacherously broke the agreement, and drove the Gala southward and westward. Many of them were starved into servitude under the Somali, and are now employed in considerable numbers as herdsmen in the Ogaden country. The Gala are mostly Pagans, but lately a considerable number of them have become converts to Mohammedanism. Their marriage customs do not include the giving of a dowry, and their conjugal morality is very lax. In intelligence they compare unfavourably with the Somali; nevertheless they are a courageous and usually self-restraining race, yet subject to violent fits of excitement when sufficiently provoked. As traders and hunters they are more skilful than a Somali, but not equal to the Boni.

The Kismayu district may be said to extend from the coast northward to the Deshek Wama lake, and on the east it is bounded by the Juba river. Kismayu, which may be considered as the capital of Jubaland, possesses a well-protected roadstead. It contains about 4000 inhabitants—consisting of Somali, a few Indian traders, and Barjun. It exports hides, maize, and cotton; it imports manufactured articles, especially cotton cloth of all descriptions. The trade at present is mostly in the hands of Khojas from Bombay. The goods are principally made in Hindustan or America. Very few British-made articles reach the country. As the seat of the Government, it is the residence of a few English officials.

Gobwein ("large plain"), 2 miles from the Juba mouth, is a village of about 2000 inhabitants. Yonti, 12 miles from Gobwein, is also situated on the Juba river. It is a military cantonment. Near this village an English company has commenced the cultivation of cotton.

The Juba river district reaches from the junction of the Juba and the Daua rivers to Yonti. The right bank is under British rule; the left is in Italian territory. From the village of Dolo, where the Daua and Juba unite, as far down the river as Serenleh (a British military post), the district is wild and uncultivated. From Serenleh to Mfudu the bank immediate to the river is covered by a dense forest. The timber, however, is not of a valuable kind, though here and there rubber-vine may be found. From Mfudu to Yonti the bank is under cultivation by the Wa-Gosha tribes. The productions are maize and simsim. In this neighbourhood the Government have established an experimental farm. The Juba river district, with its richly fertile soil, should have a great future as a cotton-growing country.

The Wa-Gosha are a confederacy of several tribes bound together for mutual protection against the Somali. The most important of the tribes are Wa-Zugoa, Yao, Wa-Swaheli, Wa-Gendu, and Mushunguli. All these tribes consist of fugitive slaves from the Somali, and they have taken refuge from their masters in the thick bush on the river-bank. Here at first they lived among the Boni tribe, to whom they gave presents as a kind of tribute. When the Wa-Gosha became more in number this tribute was refused and a fight ensued, in which the Boni were beaten and their chief killed. The Wa-Gosha then settled down, in spite of constant warfare with the Somali. This district under English supervision has an increasing population of agricultural people. They are Mohammedans. They do not attempt to keep any stock except a few goats; this is owing to the large number of tsetse fly in the bush around the swamps which are formed when the river rises in flood.

The district of Afmadu, sometimes called Bhoji, lies to the north-west of Kismayu at a distance of about 100 miles. It is a plain having thickets of bush separating grassy park-like spaces. The only permanent water-supply is at the Somali settlement of Afmadu, where there are 114 wells, many of which are now disused. The wells are in the dry river-bed of the Lak Dera, but by whom they were constructed cannot be determined. Certainly they were not made by the Somali who now use them. The heavy rains flood the country during October and November, leaving numerous small swamps, and thus a greater part of the district, where it is not covered with bush, is able to support vast herds of cattle even during the two dry seasons. This tract of country is the head-quarters of the powerful Ogaden Somali, many of whose chieftains are wealthy in cattle and camels. Ox-skins are the principal trade, and are sent to Kismayu for shipment.

The district of Eil Wak and of Wajheir have been lately described by Lieut. Aylmer. They lie on the northern boundary of Jubaland. Eil Wak (Demon Well or Well of Wak) is occupied by the Tufi Borana. Wajheir has numerous wells, and is peopled by a mixture of Borana, Gurreh, and Somali. Caravans of camels from Kismayu pass through these districts on

their way to the Abyssinian border. It is from these caravans, returning from Abyssinia, that the Somali obtain modern rifles and ammunition. As in the Afmadu district, so in the Wajheir district, there are immense herds of cattle.

The Lorian district is populated by the Talamuga Ogaden Somali, and the Borana, yet thinly owing to want of rain and the number of places abounding in tsetse fly. In other respects it is similar to the Afmadu district.

Of the tribes in Jubaland the Somali are by far the most important. In the whole of East Africa there are two branches of the Somali, the Darud and the Ishaak. The former only is represented in Jubaland.

The Dirr and Haweyeh tribes, largely represented in Italian territory and slightly in Jubaland, though called Somali are really the aborigines of the Benidir coast, and are in no way co-tribal with the Somali, with whom they seldom intermarry.

The Somali report that about 700 years ago an Arab sheik, Ismail Juberti by name, having been outlawed, fled from his country in a dhow. He landed on the Benidir coast near Hobia (or Obbia), but the Haweyeh, who then lived in the neighbourhood, refused him hospitality, so eventually he joined the Dirr tribe. From this tribe he married a wife by whom he had five sons. From one of these, named Darud Juberti, the Darud Somali are descended. The Marehan Somali claim to be descended from Essa, a son of the above-named Darud Juberti; while the Herti and Ogaden Somali claim descent from Kablalla Darud, another of his sons.

The Marehan, Ogaden, and Herti Somali are all strongly represented in Jubaland.

The Marehan tribe occupy the north-east part in the neighbourhood of Serenleh and Dolo. From Italian territory they have emigrated into Jubaland during the last twenty years, and are still inclined to be turbulent. They are possessors of large numbers of camels, and of horses also in lesser number, but, unlike the Ogaden, they do not rear cattle extensively. Probably their numbers do not exceed 5000.

The Herti Somali occupy the coast and extend inland as far as the Deshek Wama. Of the three sub-tribes of the Herti, the Midjertein are the most numerous in Jubaland, while the Wasengeleh are but few in number and the Dolbahanta still remain to the east of the Juba. The Herti do business as traders as well as rear cattle. Their numbers are about 3000.

The Ogaden Somali are split up into five important sub-tribes, the Mohamed Zubeir, the Aulihan, the Abd Wak, the Abdullah, and the Magharbul. Two other sub-tribes are of less importance, namely, the Rer Mohamed and the Habr Suliman. It is remarkable that the so-called Mad Mullah, Mohamed Abdullah Hassan, belongs to the very unimportant tribe of the Habr Suliman. Of the Ogaden in Jubaland the Mohamed

Zubeir are the most influential and numerous. They occupy the Afmadu district as far south as the Deshek Wama, and own immense quantities of cattle. The Aulihan tribe frequent the district to the west and south of Serenleh. They are rich in camels as well as cattle, and the Juba river is their main water-supply.

The Abd Wak and the Abdullah tribes occupy the districts of Rama-adi and Lorian. The latter of these tribes wander as far as the Tana river seeking for water in the dry season. The Abd Wak are the more numerous, and might be able to put 1000 spearmen and riflemen in the field. Between these two above-mentioned tribes and the Mohamed Zubeir tribe there is a constant feud which sometimes leads to a fight. The Magharbul sub-tribe occupies the sub-district to the east of Rama-adi, known as Joreh. Though they are not strong numerically, yet they are rich in cattle.

It is, perhaps, necessary to repeat that only Darud Somali are to be found in Jubaland, while the Ishaak Somali have remained east of the Juba, and that the Haweyah, the Dirr, and some other tribes are not really Somali, but are disowned as inferior races by the Somali.

The true Somali is an extremely lazy person, for his dignity does not permit him to do manual work; he generally employs himself in watching his flocks, or he will lie for hours under a shady tree, his praying-mat and water-bottle beside him, while he drones, to a sort of chant, songs about his former fights and about the stock he has looted. The manual work, meanwhile, is left to the women and the dependants. The Somali is a Mussulman of the Shujai sect and is very religious in his own fashion. In appearance the Somali is an Arab, and sometimes a handsome Arab. Treat him with confidence and consideration, he is cheerful, intelligent, willing to learn, and true to his code of honesty. Treat him harshly or unjustly, he becomes sulky, obstinate, mutinous, and dangerous. He is an excellent scout, a wonderful marcher, and very proud if confidence is shown in him. It would be fatal to the peace of the country if the Somali should be treated with that contempt which is often shown to the black races by Europeans.

Jubaland is fast filling with the Somali, who are increasing in numbers by leaps and bounds. Their camels, herds, and flocks are also multiplying in number. Except along the bank of the Juba, it can never be an agricultural country, lack of rain forbids it, but there is no reason why the trade of the country should not vastly improve if roads were made, and especially if a light railway were constructed from Kismayu northward through Afmadu to the Abyssinian frontier.

RICHTHOFEN'S CHINA.*

By W. R. CARLES.

The three volumes of von Richthofen's great work on China, published in 1912, seven years after the great traveller's death, fall in no way below the level attained by the first two. The admiration which his work had excited throughout the world, and especially in Germany, created a determination in the scientific world and among his intimate friends to produce in a complete form the material which had been collected and partly thrown into shape.

In one way this was easy of accomplishment, for the persons indicated by von Richthofen as those by whose hands he desired that the work should be completed, gave their ready assent. Dr. E. Tiessen has carried out his work as editor with all the passion and devotion of a pupil to his master, and with the ripe knowledge of the subject which had already been shown in his own work on China. A mass of material in the shape of diaries, notes, extracts, drawings, pamphlets, addresses to learned societies, etc., had been left behind, in addition to some finished and some unfinished portions of the work. The selection and arrangement of these were complicated by the fact that the scheme of the work had been changed from time to time, and that the MSS. had been written at different dates, and in some respects were not in agreement with each other in consequence of information acquired during the intervals between them. But the editor bears testimony to the intuitive perception which is shown throughout by the author of the outstanding features of the geography of China, even in those parts which had not been visited by him.

Dr. Tiessen was fortunate in having in Dr. Groll and Dr. Fritz Frech, who undertook respectively the edition of the maps and of the palæontological portion of the work, men who had worked with von Richthofen for many years, and were intimately acquainted with his views. The result has been the thorough collaboration and co-operation of the three. The text of von Richthofen's MSS. has been rigidly adhered to, and such interpolations as have been necessary have been marked as such. A most careful supervision has been maintained of the agreement in place-names between the main body of his work and the maps, and the extremely small number of errata bears testimony to the watchfulness exercised in revision of proofs. The index of vol. 3, and also of vol. 2, which had previously been omitted, was undertaken and completed by Baroness von Richthofen,

* 'China: Ergebnisse eigener Reisen und darauf gegründete Studien. Von Freiherrn v. Richthofen. 3 Band. Das Südliche China . . . herausgegeben von Ernst Tiessen; 5 Band: enthaltend die abschliessende palæontologische Bearbeitung der Sammlungen . . . sowie der Entwurf einer erdgeschichtlichen Uebersicht Chinas, von Dr. Fritz Frech. Berlin: D. Reimer. 1911-12. *Maps and Illustrations.* *M.* 32 *each vol.* 'Atlas von China. Orographische und Geologische Kartem zweite Abtheilung.' Bearbeitet von Dr. M. Groll.

who unfortunately did not live to see the issue of her husband's works from the press.

The co-operation of editors and sub-editors, the assistance lent by learned societies in Germany, and the munificent support received from the Emperor, departments of State and others, towards defraying the cost of publication of these volumes, have given them the character of a national memorial to the man to whom the foundation of German enterprise in Shantung is due. The manner in which the work has been executed, after five years of arduous toil, is in its thoroughness well in keeping with this character, and does equal honour to all concerned.

Volume 3 is essentially a continuation of the two other volumes on the country of China in its widest sense and, though on the title page it is described as relating to South China, embraces a far wider field than is therein included. Even the index of contents shows how impossible it has been to confine the work to South China, for the three parts of which it is composed are headed South-west China, Tibet, and South-east China. Physiographical conditions have necessitated the survey of a much wider area than is understood by "South China," while at the same time they have led to the partial exclusion of some prominent provinces in the south. Geology and geography in the author's works are always found hand-in-hand, and not unoften geology is the leader of the other.

The northern boundary of South China is placed by the author in the Tsin-ling mountains and their eastern continuation. The mountain systems, geological structure, soil, climate, flora, economic products and means of communication on the north and south of this range are so widely different as to make this a much truer line of division of north from south than is to be found in the valley of the Yangtse which is often regarded as such.

In the same way in the description of south-west China the characteristic highlands of Szechuen, Yunnan, and Kueichou are regarded as forming a united whole of such importance as to override arbitrary boundaries resting on administrative or historical grounds. On this ground south-west China is treated as extending to the east slope of the mountains facing the plains of Hunan and Hupeh and, following the line of the Yuan river to Kuei lin Fu, to the southern slope of the mountains between that city and Hsing-yi Fu in Kueichou.

On the other hand, the lowlands of Kwangtung, Kwangsi, Hunan, and Hupeh are grouped by the author with the south-eastern provinces of the coast.

One of the most interesting parts of the work is that devoted to the Tsin-ling mountains, both in their relation to the Kun-lun mountains and to the Sinic mountains. The latter is divided into three groups, each of which has a north-east and south-westerly direction, with a curve eastwards. The first extends from the foreground of Tibet in Yunnan to the Tchuktchi peninsula facing Behring straits; the second is formed of the ranges within which south-east China is comprised; and the third

includes Formosa, Japan, and the Aleutian islands. Each of these has a steep face on the east, but falls away more gradually on the west. But a strange feature exists in the first of these groups in that no continuation of them appears to be found west of the Stanovoi mountains north of lat. 35°, though the second and third groups are clearly continued as far as the sea of Okhotsk and the Aleutians.

The Tsin-ling mountains continue across China into Japan, with an east-south-easterly direction. Their greatest breadth is found in long. 102° E. To the west of that meridian their breadth diminishes. This may be in part only in appearance, for the southern slopes are distinguished by the deposits which, forming part of the Red basin, climb up (*ansteigen*) their sides. There is, however, a convergence towards the west of the two semi-parallel belts of which the Tsin-ling is composed.

Suess indicates a vertex (*Scheitel*) of the continent in long. 102° E., *i.e.* the meridian north of which no continuance of the Sinic range is found north of the transverse line formed by the Kun-lun and Tsin-ling mountains, and at this point the geographer is faced by the double question: (1) in what manner is the Tsin-ling traversed by the Sinic ranges? and (2) why or whether this traverse is discontinued to the north of the Kun-lun?

As to the last point, Richthofen considers that his original opinion that the traverse did continue further west is disproved by later exploration. But he appears to consider that further data are necessary in order to form a proper judgment on the other questions.

In the attempt to solve problems arising out of the impact of these and other ranges on each other, he is carried far to the west. The Djupar mountains, in the hollow formed by the Tao and Yellow rivers, in Kansu, the Nan-shan mountains, and the ranges on the south border of the Tarym basin are in turn examined as far west as long. 90° E., partly with a view to investigate the consequence of the meeting of different ranges, and incidentally to show that the mountain systems and river courses are found on exploration to follow an order of semi-parallel lines, which continues right through a region which had been conjectured to present an unparalleled example of wild confusion.

Throughout the whole of the country in the far west, where travel is so difficult and dangerous, the author is assisted by the researches of travellers of many nations, who have shown themselves not only able to surmount all difficulties of travel, but also as competent observers whose records can be trusted. The case is far different in the neighbourhood of the Treaty ports, where very little has been added to the information acquired by the author in 1868–9. He especially complains that the discovery of a Tertiary plant in the neighbourhood of Canton had instilled no one with a desire to investigate further into the presence of remains of that epoch.

In the Far West there is, therefore, an unusually solid basis on which

judgments can be founded. East of the Nan-shan, the mountains figuring in maps as the "Hsi-King-shan" are not known locally as such. The Djupar mountains in that neighbourhood have been explored by Futterer and found to consist of low ranges with the same trend and character as their mightier neighbour on the west. The north-west to south-east direction of these mountains is continued further west, and conflicts with that of the Kun-lun and its branches, which ranges from E.—W. to E. by N.—W. by S. What is the effect of the two upon each other where they meet, and whether they cross each other remain yet somewhat uncertain. But Richthofen is inclined to favour independence of the two systems, and to see the continuation of the Kun-lun in the Amasurgu range (south of Lan-chou Fu).

One conclusion drawn is that the western portion of the Bayan Khara mountains consists of four parallel ranges, the Tsaidam ending in long. 90° E., the Marco Polo in 88⅔° E., the Shapka Monomakh in 90° E., and the Prjevalski in 87° 88′ E. The large volcanic fields found by Prince Henry of Orleans and Littledale seem to be confined to the south side of the Prjevalski range, and to extend from long. 90° E. to the Tangla mountains, between lat. 34° 10′ and 36° 10′ N. The highest waters of the Yangtse are placed in long. 90° E., where sighted by Prince Henry of Orleans.

The whole of the extensive field in which the Yangtse has its sources is most carefully examined in detail. There, as in many other parts of China, the traveller is surprised to find that the highest mountains are left behind before the source is reached, and that the country beyond does not present the same difficulties which he has encountered in his ascent. This feature is intelligible enough where the great terraces, which were mistaken by early geographers for mountain ranges, exist, but is less easy of explanation in the case of the North river of Canton and in rivers draining into the Poyang lake from the Chekiang borderland.

Leaving the fascinations of the north-west for the south, there are seven separate areas which attract Richthofen's close attention, the Red basin, the Yangtse gorges, the mountains of West Szechuen, the front rank of the mountains of Tibet (*Hinterindisch*), which inclose the headwaters of the Salween, Mekong, Brahmaputra and Yangtse, the plateaus of Kueichou and Yunnan, the provinces bordering the coast (south-east China), and the lower Yangtse valley. It is impossible to give here any description in detail of any of these. The Red basin and the Yangtse gorges are the two topics to which he returns with the greatest affection. His reconstruction of the geography of those regions, as it existed before the great subsidence took place which gave birth to the basin and tilted the region between it and the mouth of the gorges from east to west, is, perhaps, one of the most striking parts of the work. In the valley between Ichang and Chungking the geological structure is now disclosed in a series of anticlines extending from the east to the west, in which the

oldest rocks found near Ichang are palæozoic Silurian. These are followed in regular succession towards the Red basin by Devonian, Carboniferous, Permian, and Rhætian. Striking features are present in the equal angles of the strata on either side of the arches; in the absolute disappearance east of Ichang of the palæozoic rocks, together with several subsequent formations; and in the comparatively slight difference of sea-level between Ichang and the Red Basin, some 2500 feet, while the subsidence of rocks from east to west represents some 13,000 feet. A whole series of profiles of the formations seen on the way from Chungking to Ichang is figured in the book, and a large coloured plate gives a sketch of the strata in the Fenghsiang and Wu Shan gorges.

The fact that, in spite of all the barriers interposed in its way by the ranges crossing its path, the Yangtse pursues its path eastwards is ascribed by Richthofen to the epigenetic formation of the river. The same phenomenon is seen in Kiangsi, where the Kan river pursues its course almost in a straight line through range after range of mountains which cross its path, until the climax is reached in the position of the Poyang lake on the line where a mountain ridge has passed from side to side. The length of time demanded for such results to have taken place, and the effect which these have had on the development of trade and the character of the people of Kiangsi, gives occasion to one of the side essays, the recurrence of which is one of the many charms of the book.

Thus in his description of Yunnan he points out that of all the states which have had their birth and development at the mouth of the rivers which drain from Yunnan to the sea, neither Indian, Burmese, Aracan, Siamese, Tongkingese, nor Cantonese has ever been able to extend its civilization inland up the river valleys, through the deep defiles which guard the river courses on the border of the province. The movement in the past has always been from the highlands to the sea. China has always realized that her possession of this centre of influence gave her influence over the nations on the lower waters of the rivers. But the advent of British and French on the coast in the present day, whose knowledge of engineering enables them to overcome the natural obstacles in their path, is introducing a change, despite the fact that China still holds the higher waters.

In an earlier chapter on the advance of the knowledge of Chinese geography, the author refers to the consequences which followed on the murder of Mr. Margary and the consequent establishment of a British Consulate at Chungking. The theme suggests consideration of the penalty which has been and still is being paid by China for the treacherous action on that occasion of the Governor-General of Yunnan. How far has the advance of French and British arms, from the sea over states which until recently acknowledged China as their suzerain, been due to results following on M. Margary's murder?

In spite of the length of time which has elapsed since the author first wrote of the Sinic range as covering the whole extent of country between

the Yangtse and Kwangtung for a depth of over 400 miles from the sea, his handling of the subject has lost nothing in interest. Even more clearly than before stands out the victory of time over nature, to which is due the direct highway through Kiangsi from north to south by easy gradients and almost entirely by water. Mountains have dissolved, while rivers have continued their course unchanged. An inland province shut off by mountains from access to the sea has formed one of the main arteries of commerce in the Empire.

In strong contrast to Kiangsi are Chekiang and Fukien, whose rivers discharge direct into the sea. Rising far behind a series of parallel ranges running north-east to south-west, the waters of these rivers have broken through range after range in a series of zigzags, until free to complete their short course to the sea. To the system of compartments into which the country is broken up, Richthofen ascribes the number of dialects which still survive in this region. Conquering armies were deterred from pursuing the petty conquest of riverhead to riverhead, separated from each other by mountains across which no prospect of plunder was visible. It may be noted that even the Taipings spared Fuhkien, though it lay next to the birthplace of the movement, and that the present poverty of the people of that province is ascribed to the fact that it then escaped devastation and the growth of the population thus remained unchecked.

The volume ends with a consideration of the volcanic group, whose centre is near Nanking and of which many offshoots are found to the north of the Yangtse, and also of the terrace-like bank which lines the foothills on the south bank of the Yangtse for many hundreds of miles. Richthofen's conclusion is that the latter formation is due to an inclination of strata, though earlier he held the opinion that erosion was the active cause.

So far no mention has been made of the descriptions of his journeys which form a large portion of the volume. These are much fuller than those which were contained in his letters to the Shanghai Chamber of Commerce in 1869–1870, and are in part supplemented by knowledge subsequently acquired. But in the more accessible regions the additional information which had been obtained since his journeys is lamentably small. While the additions to topography have been considerable, the competent observers of geology have been very few. It is to geologists more especially that these descriptions of the routes which he travelled will be most interesting. For others the fact that his journeys followed close upon the end of the Taiping Rebellion, and that scenes of cruel desolation and depopulation presented themselves to him where now little trace of either is visible, robs these chapters of their value as a contemporary record. At the time of his journeys the Yellow river pursued its southern channel, which also may cause a little confusion in the reader's mind.

The main points which seem to present themselves as new features in

the present account of the journeys are the existence of archæan rocks at Li-ho-k'ou on the Han river in Hupeh, which is the only place in south China in which they have been identified, and the presence of laterite in Hupeh as well as on many lower parts of the Yangtse and especially near the Poyang lake. Curiously enough, it is scarcely mentioned by Richthofen in parts further south, though Leclère writes of it as constituting there as prominent a characteristic as loess does in the north.

The trades, industries, economic products, and more especially the means of communication and trade routes, together with notes on mines and porcelain manufacture, are all subjects of close attention by the author. Exception may perhaps be taken to his restricting the area of agriculture to the limit provided by population for increasing its fertility. This is immensely increased in Kiangsu by the periodic dredging of canals or ponds. The mud when dried is taken, not only to neighbouring fields but, by the easy water communication which offers, to more distant lands. There is also a custom of sowing leguminous plants (*Lotus*) for a spring crop and ploughing it into the land and then flooding it, which immensely adds to the fertility of the land. This system of agriculture seems to indicate that the Chinese have from early times known empirically that some leguminous crops do not exhaust the soil. But I cannot state positively whether this knowledge is applied by them to the large area in the Yangtse valley, which is under cultivation in beans.

The fourteen maps contained in Part II. of the Atlas of China, which accompanies this work, are published in two series to represent orographical as well as geological features. Dr. M. Groll has relied upon Richthofen's data as a basis, and where questions have arisen, in the light of later discovery, as to their correctness, has rested upon Dr. Tiessen for their solution. In some cases a slight discrepancy is seen in the two maps owing to insufficient data to determine orographical lines and geological structure. With the exception of an error on the cover, where "Kuei-yang Fu" figures instead of "Kuei-tshou Fu" as the title of the map, it is difficult to find a fault in them. They are models of clearness and practically free from hypothetical delineations of river and mountain courses. The titles of the maps appear on the border instead of as insets, which so often diminish the value of maps by necessarily omitting the representation of the country in the space occupied by the inset, a defect specially noticeable in vols. 1 and 2 of "China."

But good as these maps are they are not sufficient in themselves to give the readers a clear idea of China as a whole. And it is much to be hoped that Dr. Groll will next take in hand a map which may embrace, if possible, the whole of the field with which Richthofen has dealt. It would seem, from the accurate data in the author's hands regarding the routes of all modern travellers, that the material is already in existence for the preparation of a map which would bring Dr. Bretschneider's map up to date. The insertion of these routes on an orographical map would not

interfere with its clearness. For the understanding of the geological features of China as a whole, the small area dealt with in the earlier maps is manifestly insufficient.

In vol. 5 Dr. Fritz Frech has given a review of the various fossil remains which have been placed in his hands by Richthofen, Edward Suess and von Loczy for determination. Their mass has prevented him from presenting anything in the shape of a monograph such as he apparently would have wished to produce, and has also led to his exclusion of such fields as have already been dealt with. I regret that I am no geologist, and am therefore incompetent to do justice to the merits of his work. It may be that the detailed description of the fossils and the illustrations which are published at the end of the volume are the most valuable portion of the work. But to the general reader the surveys of different geological epochs which introduce different chapters are naturally most interesting.

Dr. Frech, in his preface, remarks on Richthofen's unsurpassed acuteness of observation. Often in the field he judged the age of strata more correctly than was done by the laborious palæontologist in his study, and from a few observations determined the fundamental features of a mountain structure which later travels proved to be correct. It is indeed astonishing, in the accounts of Richthofen's journeys, to see how small a limit was placed on his breadth of view by unfavourable conditions of travel, such as fog and rain or boat journeys. It is in part the possession by him of this intuition which has made the appearance of these volumes so much desired, and which gives to them so much of their value.

AN ENGLISH DESERT.*

By ALAN G. OGILVIE.

The title of this paper is not intended to forebode a desiccation in the English climate, nor does it introduce a treatise on the arid conditions of a past geological period. It refers to the fact that we have in England, at the present time, an inland area—albeit a small one—which exhibits many of the phenomena characteristic of deserts, wherever they may be. This area is the "Long Valley" and neighbourhood at Aldershot (Fig. 1); it is roughly two-thirds of a square mile in extent.

The principal features of a desert are usually regarded as, first, the lack of sufficient rainfall to cause a permanent flow of water in the stream courses; and, secondly, the almost complete absence of a vegetation cover. The second feature is usually produced by the first—by the scarcity of moisture. In the Long Valley the rainfall is not below the average for

* Royal Geographical Society, April 24, 1913. Map, p. 612.

the south-east of England, and yet the vegetation cover is absolutely wanting. Briefly, the Long Valley has become a desert in the last few decades, not owing to any climatic change, but because of the introduction of a new and efficient agent of erosion, the hoofs and wheels of artillery and cavalry. This Aldershot desert is, then, in some degree an artificial desert, but it may yet be of interest to British geographers to have some description of land-forms probably without a parallel in these Islands.*

The town of Aldershot is commanded on the south-west by a ridge which runs generally from east to west, and of which the highest part, known as Cæsar's Camp, is flat-topped, and attains the altitude of 600 feet. It is capped by "plateau gravel," and is one of the few residual hills left by the denudation from the London basin of the "Upper Bagshot" sands and gravels. The north slope of Cæsar's Camp falls steeply away from the summit down to the 500-foot contour, then more gradually to the 350-foot line. Down to this level the slope has coincided mainly with the outcrop of sands, but a bed of gravel, by its greater resistance to erosion, accounts for the gentle fall northward of a plateau—here one-third to half a mile wide—which is now considerably dissected, and whose rim coincides roughly with the 200-foot contour. It is with this dissected plateau that we have to deal. From its northern edge the ground falls steeply to the level of the Basingstoke Canal and Laffan's Plain. The steep slope corresponds to the outcrop of the sand underlying the gravel of the plateau surface, while Laffan's plain occupies an area of "Bracklesham" beds—of a more clayey, and therefore much less permeable nature.

The entire ground just described was originally covered completely by the vegetation, which is typical of the other areas composed of the same rock types in the district, *i.e.* tracts of heather alternating with patches of a dry grass. The Scots pines which are widely distributed, and which thrive in this region, seem to have made their appearance within the last century, and they probably never became established in the Long Valley itself.

In 1855 the Long Valley, with the other Aldershot land, was purchased by the War Department. The average purchase price paid for the whole ground was £12 per acre, and as the Long Valley—then known as the "Waste of the Manor"—was obviously one of the least valuable tracts, it is evident that the soil was regarded as of the poorest.†

Since 1855 the ground has been used by troops for purposes of

* The following description should be read with reference to the accompanying map and diagram. To the map—the "6-inch" Ordnance Survey—approximate contour-lines have been added at 25-foot intervals, and supplemented by hill-shading. The courses of the wadys have also been drawn. The points from which photographs have been taken are indicated by dots and arrows; the numbers refer to the figures accompanying this paper. The diagrammatic sketch is drawn as from an imaginary view-point of some 600 feet altitude looking south.

† These facts have been kindly communicated by Lieut.-Colonel Hedley, R.E., of the Geographical Section, General Staff.

FIG. 1. –VIEW ACROSS THE LONG VALLEY FROM LONG HILL.

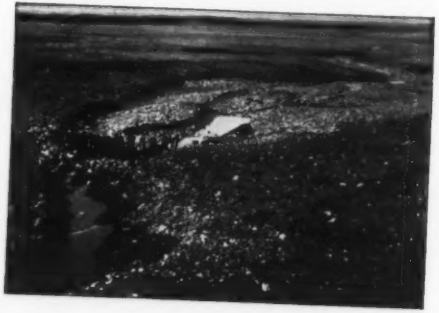


FIG. 2.—STREAM ENTERING DESERT AREA.

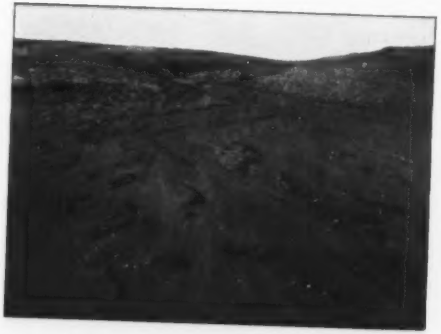


FIG. 3.—EFFECT OF TORRENTIAL EROSION ON LONG HILL.

FIG. 4.—RAVINE OF WADY ON NORTH EDGE OF PLATEAU.

FIG. 5.—SAND-DUNE WITH BENT GRASS ON MARGIN OF DESERT.

FIG. 6.—WADY BED AT NORTH-EAST MARGIN OF DESERT.

manœuvre and for reviews. In the course of thirty years the thin covering of heath was worn off, and as late as 1887 a black dust derived from the underlying humus was still to be seen all over. Wind and rain, assisted by the agents mentioned above, have now completely removed this layer, and sand and gravel alone are visible.

The ever-increasing use made of the Long Valley by cavalry and artillery has prevented the re-establishment of vegetation; moreover, its absence has left bare a gravel stratum which is peculiarly liable to fast erosion. Mr. Clement Reid, of H.M. Geological Survey, who has made a careful study of other English Tertiary gravels, informs me that he believes the white colour of the gravels to be due to a bleaching by humous acids derived from a former covering of peat. This bleaching process would also involve the removal of the cement from the gravel.

Such, then, are the conditions under which the desert has been formed. The existing surface features have been produced mainly by torrential rains and by wind action. There is no continuous running stream in the desert area. A spring (marked "Sp." on the map), thrown out by a less porous stratum at the 366-foot level, provides water even in dry seasons. A well-formed stream bed runs from it into the valley, but the water, under ordinary circumstances, loses itself in the sand after flowing about 100 yards. This stream is shown near its source in Fig. 2. The piles have recently been driven in to retard erosion. On the dry surface of gravel and sand a system of stream courses has been developed. These are only filled after sudden torrents of rain, though after several days of continuous rain there is some flow in them. It has once been my good fortune to see these wadys in flood after a violent thunderstorm. They were filled with rushing torrents which carried down large quantities of sand and gravel. Ordinary rain-showers have no effect on the Long Valley, as the water sinks in at once. During the occasional flow of the wadys, however, a great deal of transport takes place in a short time.

The steep sides of Long Hill and Centre Hill are gashed by streams, so as to show on a small scale the forms typical of mountain torrents: viz. the gathering basin—fan-shaped, with the apex downstream—below it the short flow-channel, and below that again the alluvial fan, with the apex upstream (Fig. 3). It is on the northern scarp edge of the gravel plateau ("Ravine Head" on the map) that the greatest amount of work is being done by running water. This edge is fretted by a number of small ravines, down which occasional torrents tumble to the marshy ground below the 275-foot level. Headward erosion goes on very fast here. Fig. 4 shows one of these gullies cut in the gravel-capped plateau, and also, in the distance, the higher plateau of Cæsar's Camp. The photograph was taken in June, 1912, and in January of this year the ravine was difficult to recognize, as the escarpment had receded several yards, and only the right-hand fork of the wady remained. Piles are now being driven to retard erosion in these gullies.

More unusual than this water erosion is the great part played by wind in the denudation of this inland area. I have been in this desert on many windy days and have seen and felt the effect of the biting sand blast. The hoofs and wheels maintain a relentless attack on the surface, and the wind is enabled to produce a steady lowering of the surface by blowing away the lighter particles. The plateau must thus tend to become less and less sandy, and more and more gravelly as time goes on. The lighter dust is probably conveyed beyond the margins of the area, but the sand accumulates on these margins in the form of small dunes. Sand accumulations are to be found all round the desert, but, as might be expected, it is at the north-east corner that the best-formed dunes are to be seen.

Fig. 5 shows one of these of which the height was some 5 feet. These dunes must certainly have been formed within the last twenty-five years, and probably within a much shorter period than that.

Fig. 6 shows the bed of a wady near its outlet from the desert. On the left bank a dark line can be seen some distance below the top. This is a thin stratum of humus which almost certainly marks the land surface previous to 1855. The wady has here cut down some 3 feet below that surface, while some 2 feet of blown sand has accumulated above.

There are evidences not only of the deposit of sand, but also of its erosive action. In Fig. 7 the small tree, which is bent by the wind, has its roots well above the level of the dark humus, and appears to have grown upon a superficial deposit some 8 inches thick. Then a renewed accumulation of wind-blown sand formed above the tree roots. Vigorous erosion by wind of the partially fixed sand-dunes has taken place here, and the bulk of the photograph is occupied by a "blow-out" or wind trough reaching down to the gravel. The tree, however, has acted as protection to a small island, and the effect of wind erosion on the right-hand side of this is well seen. Fig. 8 is on the gravel bottom of the Long Valley proper. The small grass-covered hummocks, some 2 feet high, are composed of blown sand. They are residual outliers of a deposit, the bulk of which has been removed by wind erosion.

Thus in and about the Long Valley we can study occasional torrential floods in wadys, the effects of rapid and concentrated water erosion, the general lowering of level by removal of sand by wind, and lastly the effect of the wind, both in depositing the sand and in using it as a tool of erosion. All these are phenomena for the study of which in inland areas we must normally go to regions of arid climate.

Dr. STRAHAN : Before I call upon the author of the first paper, may I say a word of congratulation that we are holding a meeting for the first time in our new home? I will now ask Mr. Alan G. Ogilvie if he will be so kind as to read his paper on "An English Desert."

Dr. STRAHAN (after the paper) : We are indebted to Mr. Ogilvie for a suggestive paper on this English desert, which, small as it is, yet produces some of the phenomena of the real desert. It must be remembered, however, that its condition is due

to artificial interference, whereas that of the real desert is due to natural climatic peculiarities. The account of it reminds me of a walk I took many years ago in the Isle of Wight with Dr. G. K. Gilbert. I showed him a chine in the Isle of Wight (a wadi, as I suppose I may call it). The wind had got into the ravine, and by eddying round within it had widened it into a nearly circular hollow, in the sides of which the edges of the horizontal strata were beautifully developed tier above tier. Dr. Gilbert at once recognized it as a typical example of desert scenery, due to the action of wind on stratified sands. Mr. Ogilvie's "desert" appears to me to be only now in the process of formation. As years pass it will be interesting to watch the development of features—to see the accumulation of sand on the plains, the cutting of wadis, and the growth of scarps, always supposing that the vegetation is not allowed to reassert itself.

Mr. LAMPLUGH: The paper we have listened to is a good description of the effect of wind and water erosion on bare ground in our climate, and it illustrates in a marked degree what is taking place to some extent in almost every cultivated field of sandy or light soil. On the sandy Bunter country of the north Midlands, for example, wherever the land is tilled, I have seen in a dry spring, before the vegetation has grown, that strong winds have driven the loose soil from one field to another, causing much loss to the farmer; and the same trouble is experienced in peaty areas under cultivation. In this sense we might say that every cultivated field is, to some extent, a little island of desert for a time in a dry season, but I think that we should not push the analogy too far.

It is the same with regard to wadis or flood-gullies. These dry valleys are very prevalent even in well-watered countries like our own. In fact, after a dry summer the majority of our smaller valleys are dry valleys, and I cannot but think that too much importance is given, in current physiographical teaching, to the influence of the permanent stream as a factor in valley-erosion. The valley is essentially a flood-channel, and over most of the Earth's surface very few of the valleys have permanent streams. In every part of England one finds, in the course of field-work, many steep gutters or "wadis" that are dry in the summer months, but act as channels when the rains come.

With regard to the effect of vegetation on the amount of water thrown off during heavy rains, I remember seeing a very striking example some years ago on the Yorkshire wolds, where there is an elaborate valley-system without any permanent streams. It happened that a local torrential rain fell in June (1888) on the wolds above the village of Langtoft, and threw a big flood suddenly down the dry valley in which the village is built, doing much damage to the houses. In pouring into the valley the flood had cut two or three deep gullies in the steep slope of chalk, and had spread out a fan of wash in the bottom of the dale. I found that the water that cut the gullies had all run off from a tract of bare tillage-land recently sown with turnips on the upland, while the cornfields on both sides, where there was a good cover of vegetation, had held the water till it had time to soak underground, so that they had hardly contributed anything to the flood. The flood was mainly due to the accident that there was a gently sloping tract bare of any vegetation on the brow of the dale at that particular time.

Mr. Ogilvie has described an interesting case of what would happen almost all over this country if the land were permanently bare of surface cover, and he has shown how, under these conditions, we may watch the physiographical outlines being shaped and altered from year to year.

Prof. HERBERTSON also made a few remarks.

Mr. C. CARUS-WILSON: I have been much interested in Mr. Ogilvie's paper. It is a very useful contribution to our knowledge of psammology. I have seen myself

similar instances naturally produced on a smaller scale in some of the chines on the Hampshire coast and on heathlands where gravel has been dug and clay has been removed. Close to Corfe Castle there is a large area where most of these features may be observed. It would be interesting if Mr. Ogilvie could tell us whether he has carried out a microscopic examination of the sand-grains forming the dunes, so as to compare them with those that have not been shifted. If it were possible to show that the sand-grains of the dunes had become rounded during the period, it would give us an idea as to the rapidity with which similar grains may become rounded under usual desert conditions. I should very much like to know the speed of the advance of these miniature sand-dunes. I take it they are advancing in the direction of the prevalent wind, and I suppose that they are gradually overwhelming the neighbouring vegetation, heath areas, etc., that are still in their original natural condition. If so, there will come a time when these sand-dunes will cover a larger area and destroy the vegetation underneath, so that this desert, which was originally produced by the feet of horses and men, will eventually become very much larger than it is at present.

Mr. Ogilvie: I should like to thank the speakers for their very interesting remarks. I have to thank them specially for their presence this afternoon, because they might have spent the time more profitably in hearing a lecture by that most distinguished authority on deserts, Prof. Walther.

There are two points to which my attention has been drawn by Mr. Chisholm, of Edinburgh, which may be interesting in relation to this paper. The first reference is to a paper by Prof. Dodge, of New York,* in which he describes the formation of *arroyos* in adobe-filled valleys in the south-western United States. He shows that these valleys, which were formerly gently sloping and grass-covered, have within recent times been dissected by deep ravines, which are filled with water only during torrential rains. The Navajo Indians explain the formation of these *arroyos* by the introduction of sheep by the white man—the cropping of the grass and the wearing of paths by the sheep in the centre of the valleys initiating the torrential erosion.

The second reference is to the report of Sir W. Willcocks as to the possibilities of irrigation in South Africa.† In it he draws attention to the effect upon erosion of the making of roads and railways in the last thirty years. Rains are collected in these artificial features, and by their overflow have transformed what were formerly insignificant valleys into deep ravines.

I was much interested in the remarks of Mr. Lamplugh. It is, of course, very important for us to realize the real meaning of those features which are so common in England—the dry valley and the movement of soil in fields. I do not suggest that the desert analogy is applicable to dry valleys, such as those of the chalk. The other features which Mr. Lamplugh has described are interesting examples of phenomena which are seen in the Long valley in an exaggerated form. It is because of the concentration of miniature desert features in so typical forms in one small area that I have described this as "an English desert." As to the question of the sand-grains, I have not examined them microscopically, because the sand has moved such a very short distance from its original position to the dunes that I do not think the grains can possibly have become at all rounded. As to the movement of the dunes, they cannot move far, because they will advance into the Basingstoke canal, and will at once cease to be dunes. There is some evidence that the dunes are moving

* *Trans. Brit. Assoc.*, Winnipeg, sect. E, p. 581.

† 'Further Correspondence relating to Affairs in South Africa' [Cd. 1163], 1902, p. 52.

in a north-easterly direction, and Fig. 8 shows the relics of a blown-sand deposit, the bulk of which has been eroded and transported towards the north-east.

Dr. STRAHAN: If it is not desired to put any questions, it merely remains for me to signify your thanks to Mr. Ogilvie for his exceedingly interesting paper.

REVIEWS.

EUROPE.

'THE Guadalquivir: its Personality, its People, and its Associations.' By Paul Gwynne. (London: Constable. 1912. Pp. xiv., 386. *Illustrations.* 7*s.* 6*d. net.*) Mr. Paul Gwynne's monograph on the Guadalquivir is devoted mainly to the topography, attributes, historical associations, and so forth, of what is certainly the most historic river of Spain. He finds room, however, for a discursive narrative of his personal experiences in Andalusia and many digressions on social and artistic topics. But the book is so readable and entertaining, the author's knowledge of Spain so intimate, and his sympathy with the people so obvious, that few readers will resent the numerous digressions. The author's remarks on the ethnological influence of the Guadalquivir and other great rivers are instructive and suggestive. That a river influences the character and development of the race through whose country it flows will hardly be disputed, and Mr. Gwynne observes that the Guadalquivir is the only Spanish river possessing this attribute to any great extent. Certainly, most of the famous rivers of the old world, Euphrates, Tigris, Nile, Indus, etc., are closely bound up with the great events of ancient history. It is strange to learn that there is much dispute among Spanish geographers as to the actual source of the Guadalquivir, the Geographical Institute placing its source in the Cazorla hills, while the Hydrological Commission hold that the actual source is in the Aguas Frias, in the gorge of El Corralon. The author, however, seems to disagree with both these authorities.

'The Brenner Pass.' By Constance Leigh Clare. (London: The Century Press. 1912. Pp. xvii., 310. *Sketch-map and Coloured Illustrations.* 6*s. net.*) In this attractively illustrated volume Miss Constance Leigh Clare gives the result of twenty years' intimate acquaintance with Tirol and the Tirolese. The importance of the Brenner, the leading physical feature of the country and the natural link between Bavaria and North Italy, explains the title of the book. Indeed, there are few of the great Alpine roads which better repay the historian, the archæologist, naturalist, or artist, to say nothing of the ordinary holiday-maker, than this magnificent highway which serpentines through the mazes of the Eastern Alps. The railway naturally diverted most of the traffic from the pass, but the advent of the bicycle and motor-car has brought the life-blood back to this great artery of Tirol. The author devotes an interesting chapter to the stubborn resistance of the Tirolese, under the patriot Andreas Hofer, against the French and Bavarians, and quotes a curiously inconsistent letter from Lord Bathurst, the Foreign Secretary, in which, while asserting the justice of the Tirolese cause, the British Government impresses upon Hofer and the other leaders the futility of further resistance to France, and at the same time promises pecuniary aid.

'Lucca' (Mediæval Towns Series). By Janet Ross and Nelly Erichsen. (London: Dent. 1912. Pp. xiii., 354. *Illustrations and Map.* 4*s.* 6*d. net.*) Though the artistic interest of Lucca—associated in most people's minds merely

with olive oil—is inferior to that of Perugia, Assisi, or Ferrara, to say nothing of the great "show-cities" of Italy, it contains much to attract the intelligent tourist. Indeed, the "City of Light" might appeal especially to our countrymen, for her greatest saints were British, while, according to an epitaph (now removed) in the Church of S. Frediano, a seventh-century Saxon king, the legendary St. Richard, is buried there. The authors have kept strictly to the general plan of this series. We have first a well-written sketch of the history of the little Republic, from Roman times down to 1860, when it was incorporated with the kingdom of Italy; then follows a detailed description of Lucca's chief architectural features—its church, palaces, and towers, for which Miss Erichsen is responsible. These chapters are readable as well as informative.

'Andorra: the Hidden Republic.' By Lewis Gaston Leary. (London: Unwin. 1912. Pp. x., 191. *Illustrations.* 5*s. net.*) Andorra has been aptly described as a curious survival from the wreck of feudalism. This isolated, self-contained little Republic, hidden in the recesses of the great mountain wall which separates Spain from France, is under a sort of dual control, Spain and France having been the joint suzerains since the thirteenth century. The intricate history of the feudal relationships with the Bishops of Urgel representing Spain; with the noble houses of Foix, Brailly, d'Albret, and Bourbon; and with the present French Republic, is skilfully unravelled by Mr. Leary. In effect, the story of the Republic is that of a thousand years' struggle between Church and State. Though the political and historical interest of this sturdy little republic appeals most to the author, he has not neglected the present-day aspects of Andorra, and he gives an attractive picture of the social life of the inhabitants. Andorra, together with the little Italian Republic of San Marino and the miniature principalities of Monaco and Leichtenstein, are the only mediæval states of Europe that have escaped absorption by the Great Powers, and of these, Andorra is the oldest, the largest in area, and the smallest in population.

'Southern Italy and Sicily.' 16th edit. By Karl Baedeker. (London: Unwin. 1912. Pp. lvi., 508. *Maps and Plans.* 6*s. net.*) There is little that need be said of this classic guide-book except that the new edition has been considerably enlarged, and, in common with others of the series, has been carefully revised. The description of the Naples Museum, containing in some respects the most valuable collection of antiquities in Italy, has been rewritten. The maps, one of the most valuable features of these guides, have been carefully brought up to date, and plans of Sorrento, Capri, Salerno, Amalfi, Girgenti, and Sassari have been added.

ASIA.

Bornean Tribes.

'The Pagan Tribes of Borneo.' A description of their physical, moral, and intellectual condition, with some discussion of their ethnic relations. By Charles Hose, D.Sc., and William McDougall, M.B., F.R.S.; with an Appendix on the physical characters of the Races of Borneo, by A. C. Haddon, D.Sc., F.R.S. Two vols. London: Macmillan & Co. 1912. 42*s.*

It has long been known that Dr. Charles Hose was preparing a book on the natives of Sarawak, for which task his prolonged, extensive, and intimate acquaintance with most of the tribes inhabiting the Raj singled him out as the most competent person. A work of this magnitude and complexity is peculiarly difficult for a man whose life has been one of action rather than of expression, and consequently the collaboration by Dr. W. McDougall has been of great

advantage alike to the chief author and to the reader. Dr. McDougall has travelled sufficiently in Sarawak to be able to appreciate the local condition and to gain some knowledge of the spirit of the people, and his wider experience in Torres strait and elsewhere, together with his psychological studies, have served to give him a broad outlook; in fact, the dual authorship may perhaps be likened to the association of Moses and Aaron of old. A few pages are devoted to a sketch of the geography of Borneo; as there was so much to say about the people, space could not be spared to describe various types of scenery or the characteristic flora and fauna: but these subjects are amply dealt with in Beccari's 'Wanderings in the Great Forests of Borneo' (1904). The short history indicates the outside influences that have affected Sarawak from time to time.

The pagan tribes of Sarawak are grouped as follows: (1) Sea Dayak or Iban, (2) Kayan, (3) Kenyah, (4) Klemantan, (5) Murut, (6) Punan. The salient characters of these groups are summarized in chapter iii., and their racial and cultural affinities are discussed in chapter xxi., and again in an Appendix where statistical data are provided for the specialist. The authors allow the question of an ancient Negrito population to remain open; no Negrito community at present exists, and there are no distinct traces of such a race. In the Appendix it is pointed out that there are no traces of Melanesians, nor of Pre-Dravidians, unless the "black"-skinned Ulu Ayars of Netherlands Borneo be representatives of that Australoid stock, but the influence of a much later immigration from South India must not be overlooked. Indications of a dolichocephalic population are found in the Murut group (Murut, Dusun, Kalabit, etc.). The yet more heterogeneous Klemantan group comprises such tribes as the Land Dayaks (the Ulu Ayar, etc., of Netherlands Borneo), the Sepob, and numerous tribes living between the mountains and the coast, and shades off into Kenyah and Punan, all of whom are supposed by the authors to have reached Borneo while it was still connected with the mainland; the Punan alone retaining the primitive cultural status. They regard this group as Indonesian despite the general tendency of ethnologists to restrict that term to a dolichocephalic stock, whereas these peoples are mainly brachycephalic. Later, according to them, Borneo was invaded by the Kayan in the south, the Murut in the north, and the Iban in the south-west. Of these three invasions, "that of the Kayans has been of most effect in spreading a higher culture among the indigenous population." Arguments are adduced to show that the Kayans migrated to Borneo from the basin of the Irawadi, possibly some seven hundred years ago. The Karens seem to the authors to be the people "most closely akin to the Kayans." Chinese, Indian, and Malay migrations are also alluded to. Only a small space is devoted to these problematical matters, the rest being concerned with a very readable though detailed account of the social system, daily life, agriculture, hunting, fishing, war, handicrafts, art, magico-religious beliefs and practices, folk-tales, and so forth, of the people. The Kayan are taken more especially as a type, the correspondences and divergences of other tribes being noted. There is a distinct advantage in selecting one tribe as typical, for it gives the reader a more definite conception, and as the Kayan are the most highly organized of all the tribes (though the Kenyah approach them closely), we can gain a clear impression of the high-water mark of culture among the pagan tribes. As a set-off to this we have a chapter on the nomad hunters, the gentle savages of the jungle. The characteristics of the Iban have recently been admirably set forth by the Rev. E. H. Gomes in his 'Seventeen Years among the Sea Dayaks of Borneo' (1911). H. Ling Roth's useful compilation, 'The Natives of Sarawak and British North Borneo' (1896), is still indispensable, though for fuller and more accurate information on

many of the tribes the student will naturally refer to Hose & McDougall's work. The chapter on Government gives a good idea of the principle of self-government adopted by H.H. Rajah Brooke, and also of the peculiar position in which a Resident sometimes finds himself; the graphic account of the peace-making at Claudetown in 1889 recalls one of the most interesting of the present writer's experiences. It seems superfluous to add that Drs. Hose and McDougall have produced a book that is as interesting as it is valuable, and that it will remain for a very long time the authoritative work on the people whom the senior author knows and loves so well. Finally, a word of praise must be given to the 211 plates (4 being coloured), most of which are excellent collotype reproductions of beautiful photographs, for the most part taken by Dr. Hose; they alone are worth the cost of the book.

A. C. HADDON.

VEGETATION OF TRANSCASPIA.

'The Second Danish Pamir Expedition conducted by O. Olufsen.' Studies on the Vegetation of the Transcaspian Lowlands. By Ove Paulsen. *With 79 Figures and a Map.* Copenhagen: Gyldendalske Boghandel. Nordisk Forlag. 1912.

We have given us in this paper a most interesting account of the vegetation of the deserts of the Transcaspian plains. The territory included in the last term corresponds more or less to the Russian Government Transcaspia, bordered on the west by the Caspian sea, on the south by North Persia, in open communication with Russia in the north through the plains north of the Caspian sea, and stretching east as far as Lake Balkhash. It is practically Turkestan without the Kirghiz steppes. Steppes have a closed vegetation, and the soil contains a good deal of humus and is surface-moist. There are few sulphates and chlorides. In the true deserts, however, the vegetation is open and interrupted. There is but little humus, and the subsoil contains more water than the surface soil. Hence we not infrequently get trees and bushes which are able to reach the deeper water-supply with their longer roots. Sulphates and chlorides are plentiful. The author gives an account of the five different types of formations met with in this area. He distinguishes salt, clay, stone, and sand deserts, and river-side thickets. In the salt deserts we get annual and perennial halophytes and a few small bushes. Spring flowers are not known, all plants being at their best during the summer. The clay deserts, generally higher in their situation than the salt deserts, are winter-moist, and therefore have a spring flora, and summer-dry, which gives them a very xerophil summer flora. In the stone deserts, as yet not properly worked out, the vegetation is represented mainly by xerophil stunted shrubs and undergrowth. In the sand deserts the author describes several types of vegetation. The barchans are slowly migrating yellowish dunes of inland sand. They produce annuals mostly. The more or less stationary hummock sand carries a comparatively rich flora; the flat sedentary sand plains have a steppe-like vegetation. The dune-chain sands are not drifting rapidly, and small switch-like desert shrubs are found here. The recently formed dunes along the Caspian coast, and following the direction of the wind, bear annuals mainly, and in great abundance *Aristida pennata*, which plant corresponds to our *Psamma arenaria*. The river-side thickets may in some cases practically form small forests. Earlier in the book some statistics are supplied in order to give some idea of the geology and meteorology of the district. The book concludes with an account of the growth-forms met with, and a systematic account of the plant species.

O. V. D.

Twentieth-Century India.

'The Empire of India' (the All Red Series). By Sir Bampfylde Fuller, K.C.S.I. London: Pitman. 1913. Pp. x., 313. *Maps and Illustrations.* 7*s.* 6*d.*

This is an admirable summary of the political and economical conditions of India of to-day. Sir Bampfylde Fuller has presented a comprehensive conspectus of the country, and though his personal views are not unduly obtruded, he does not shirk occasional criticism. His observations and conclusions, the fruit of long and varied administrative experience, are certainly well worth the attention of the politician and publicist. In addition to the chapters dealing with physical features, natural history, commerce, agriculture, industries, etc., which are common to the series, there are illuminating and suggestive ones on such topics as educational policy, effects of climate on Europeans, police organization, relations of Native States with the Government, land revenue, etc. But perhaps the most valuable portion of the book is that which deals with India *in posse*, especially with regard to the political aspirations of the so-called National party, and the results of the remarkable development in social and economic directions, which is such a significant feature in the history of twentieth-century India.

The author employs a striking and ingenious metaphor to show the peculiar, and in some respects anomalous, position of the Native States. He compares India to an ancient tessellated pavement which has been restored, the *tesseræ* representing the Native States, and the replaced slabs and plain stone the territories that have come under British administration. Equally lucid and illuminating is his exposition of the respective powers and functions of the Viceroy and Secretary of State for India. Indeed, we have never seen them so intelligibly and precisely defined before.

In his reference to the transfer of the seat of government from Calcutta to Delhi, Sir Bampfylde Fuller naturally adopts a rather guarded attitude, but he is evidently not in favour of it, and observes that at Delhi the Government will be beyond the influence of the non-official European life, and that "the concerns which lie nearest to it will be those of the native princes."

The illustrations are good, and it is something to get a new point of view of the much-photographed Taj Mahal.

E. A. R. B.

Nepal.

'Picturesque Nepal.' By Percy Brown, Indian Educational Service. London: A. & C. Black. 1912. 7*s.* 6*d. net.*

Nepal is undoubtedly one of the least-known regions of India, and Mr. Brown has done well to place on record so much literary information as well as an interesting collection of photographs of art objects characteristic of the country and its aborigines. The modernization of this State is making great strides and the older architecture, temples, dwellings, carving, ornamentation, and metal work visible on all sides, deserved to be pictorially reproduced before they decay or disappear under the utilitarian changes of Western civilization. The Newars, who are the aborigines and the largest section of the Nepalese, besides forming the bulk of the populations of the ancient capitals of Patan and Bhatgaon as carpenters, masons, metal workers, and printers, are ingenious and skilful, and the strikingly picturesque appearance of old Nepal is largely due to their æsthetic temperament. As the author remarks, "In two particular branches of artistic embellishment these people excel—in the decorative treatment of their houses and palaces and the enrichment of their temples and shrines. The streets and

squares of Patan and Bhatgaon bear eloquent testimony to their success with the former, while the riot of carved wood and embossed metal on the sacred buildings in all parts of the valley is one of the most instructive features of the State." Next in numbers to the Newars come the Gurkhas, who comprise the dominant and warlike section of the combined community, and whose excellent qualities as soldiers are well known and recognized by all military authorities. The State itself has a standing army of at least 20,000 men, well equipped and regularly drilled. The chief feature of this small volume is a collection of some forty excellent photographs, chiefly dealing with temples, shrines, and the more conspicuous and ornamental palaces and public buildings. There is a small historical summary of Nepal's associations with the outer world, but we miss any reference to Orazio della Penna and his long sojourn in the Nepal valley, which supplies an interesting link between the State and the early Roman Catholic missionary movement in Tibet.

A Baedeker for China.

'Northern China and Korea.' 2nd edit. By J. Madrolle. Paris: Hachette. 1912. Pp. 471. *Maps and Plans.* 15*s. net.*

In this guide M. Madrolle attempts to do for China what Baedeker has done for European countries, and such a traveller's handbook was badly needed. China will, perhaps, soon take the place of Japan among globe-trotters as the principal touring field in the Far East, owing to the remarkable railway expansion in the last few years. There are now no less than 5800 miles of railway open for traffic, and about 2200 miles under construction. Indeed, in a few years a "Trans-Chinese Express" will take travellers from Manchuria and Peking to the opposite confines of the country—to the teeming city of Canton, and the vast emporium of Hong Kong.

The arrangement is well adapted to the needs of tourists, the parts of this vast country ill-supplied with means of communications being only cursorily noticed. The bulk of the book deals with the treaty ports and the great inland cities easily accessible by rail or river-steamers, while carefully drawn plans of these cities supplement the text. Korea being now traversed in the "new overland" to Japan, is very fully described. For a work covering so wide a field, and one for the most part virgin soil to the guide-book compiler, the percentage of errors is low. We have only come across one serious omission—in the paragraph dealing with means of locomotion in Tientsin, the electric tram service is ignored.

E. A. R. B.

'The Royal Visit to India.' By the Hon. John Fortescue. (London: Macmillan. 1812. Pp. viii., 324. *Illustrations.* 10*s.* 6*d.*) The Royal journey appears to have been singularly fortunate in its historian. The subject cannot have been an easy one to handle, but the writer's clear descriptions of the great pageants and the arrangements for them, his minute appreciation of episode and colour, his occasional gentle criticisms, are admirable. Into the formal setting of the whole there are skilfully introduced homely notes of informality when the author deals with the voyages out and home, and with moments of recreation in India.

'The Lushei Kuki Clans." By Lieut.-Colonel J. Shakespear. (London: Macmillan. 1912. Pp. xxii., 235. *Map and Illustrations.* 10*s.*) This volume, published by the orders of the Government of Eastern Bengal and Assam, deals with clans whose range extends from Manipur into adjacent territories both north and south, and whose original home is probably to be sought in the middle valley

of the Manipur river, within the Chin hills district. The book treats fully of characteristics, customs, religion, and lore, and has a chapter on languages and dialects, with a comparative vocabulary of the Thado and Lushai speeches, and notes on others allied to them.

'Pioneers in India.' By Sir Harry Johnston. (London: Blackie. 1913. Pp. xiv., 320. *Illustrations.* 6s.) In this volume of his 'Pioneers of Empire' series, Sir Harry Johnston has a wider field than in those cases where he has only episodes of early exploration to draw upon. These, of course, form his theme for the most part in the present case, but the vast subject of the pre-British history of India is sufficiently touched, and it may be added that Tibet and other countries neighbouring to the Indian empire are dealt with incidentally. Considering the special object of this series, the well-proportioned treatment of the subject of the present volume commands admiration.

'Einführung in die Tropenwelt: Ceylon.' By Dr. K. Guenther. (Leipzig: Engelmann. 1911. Pp. x., 393. *Map and Illustrations.*) This is a pleasant description of travels in Ceylon by an author who has studied the natural history of the island. It has many good photographs rather roughly reproduced, and a great number of these are botanical studies.

AFRICA.

Italian Somaliland.

'La Somalia Italiana nei tre anni del mio governo.' Relazione del Senatore Nobile Giacomo de Martino. Roma. 1912.

This quarto volume, consisting of some two hundred closely printed pages, details all that there is to be said from an administrative point of view regarding the colony and protectorate of Italian Somaliland, from the Gulf of Aden southwards to the river Juba, the frontier of British East Africa. The southern part of this region is the Italian colony, properly so called, while the northern part consists of the native states under Italian protection. The Senatore's report is strictly an official document, much after the style of an Indian Provincial Administration Report, in which the gradual progress and development in each department are noted. Regarding the progress made in cotton cultivation along the banks of the Juba, Mr. H. Powell, the head of the Agricultural Department of British East Africa, gives an entirely favourable opinion, and the result encourages the author of the Italian Report to declare that cotton is the most important and promising product of these parts. It may be supposed that the greater part of this voluminous report is not exactly suited for general review, but the progress made in such fields of experiment as colonizing and immigration, both white and coloured, veterinary and sanitary operations, agriculture and irrigation, are an encouraging proof of the energy with which the governor and his staff have pursued the great task of material development throughout the possession during the past three years. The report is illustrated with several photographs, but the numerous and carefully produced maps are a more useful feature.

West Africa and the Congo.

'Dawn in Darkest Africa.' By John H. Harris. Introduction by the Earl of Cromer. London: Smith, Elder & Co. 1912. *Illustrations and Map.* 10s. 6d. *net.*

In writing this book, Mr. Harris has performed a public service. The reader who may be in doubt as to what is meant by the phrase "Darkest Africa"—certainly not a geographical term—soon discovers that the author is dealing

with West Africa, and in West Africa Mr. Harris includes not only Angola, but the whole of Belgian Congo. His object is to describe existing conditions, moral and material, in that part of the continent and, specially, to consider the methods of government adopted by European powers in dealing with the Africans, and the consequences which have followed those methods. To quote from Lord Cromer's introduction, Mr. Harris writes "as a fair-minded and thoroughly well-informed observer," and he has "acquired a firm grasp of the main principles which should guide Europeans who are called upon to rule over a backward and primitive society." His verdict on the balance of evidence is, that dawn is coming after darkness, but the coming of day has been nevertheless hindered as well as aided by the doings of the white man.

The book is divided into five parts. The first part describes African types, scenery, and customs. It includes an illuminating chapter on the African woman, with some not unkind side blows at the white woman of fashion. Part ii. deals with civilization and the African under such headings as The White Man's Burden, the Educated Native, and Race Prejudice. (It is noteworthy that of all the European overlords of Africa the Portuguese alone have no colour-bar; though there are also instances of Frenchmen who exhibit no racial antipathies.) The whole of this section deserves careful study. In Part iii. land and labour problems, slavery, and the future of the Belgian Congo are discussed. Among other things, Mr. Harris describes the manner in which British authority is employed in Southern Nigeria to uphold the system of domestic slavery. Part iv. is concerned with economics (the products of the oil palm, the rubber and cocoa industries) and with the progress of Christian missions. The chapter on missions is judicious and discriminating. It is worth noting that while Roman Catholics have the best industrial missions, the Protestant missions do the finest medical work. The former prejudice among Protestant missionaries against industrial missions is now, however, almost dead.

In Part v. Mr. Harris tries his hand at rearranging the map of Central Africa. It is an extremely interesting excursion into political geography. The author starts on the assumption that "the extensive Congo territories are too heavy a responsibility for Belgium," and he suggests that Germany should take over the greater part of Belgian Congo—but not the lower regions—and a portion of French Congo. In this connection the author does not appear to take into account the recent territorial changes in the Congo-Kamerun region. Compensations by Germany are indicated. As Lord Cromer says, the suggestion, to the diplomatic mind, is somewhat startling, and this is not the place in which to discuss it.

The book has many and excellent illustrations, and there is an outline map.

F. R. C.

Nigerian Peoples.

'The Tailed Head Hunters of Nigeria.' By Major A. J. N. Tremearne. London: Seeley, Service & Co., Ltd. 1912. *Illustrations and Sketch-map.* 16*s. net.*

'Hausa Superstitions and Customs.' By the same. London: John Bale, Sons & Danielsson, Ltd. 1913. *Illustrations, Text Figures, and Maps.* 21*s. net.*

These two books are in a sense complementary to one another. Each deals with people inhabiting Northern Nigeria, and each seeks to paint the picture, as it were, from the inside—to show us certain races as they appear to themselves. This is specially the case with regard to the book about the Hausa. The other volume deals mainly with tribes living in the "Pagan belt" which extends on either side of the Benue river; but it contains much other matter of interest, vividly picturing the life of the British official in West Africa, and helping us to

understand the light in which the negro regards the white man, especially when he comes as judge and tax-gatherer combined. Major Tremearne has now had many years' experience of the West Coast, and he is a close and sympathetic student of native customs and culture. This helps us to a comprehension of the view-point of even a naked head-hunting cannibal.

'The Tailed Head-Hunters of Nigeria' is, however, not quite an accurate title, for it appears that in the tribes to whom this designation is applied it is the men who do the head-hunting and the women only who wear the tails. These Nigerian women are not the sole tail-wearers known, but no other people seem to wear such elaborate appendages, nor to attach so much importance to them. The tribes who go head-hunting live mostly in the border-lands of the Nassarawa and Bauchi provinces, with the town of Jemaan Daroro as centre. Theirs is for the most part a hilly country, difficult of access. Feuds with one another and with Hausa and Fulani have separated tribes of the same stock and led to much specialization, though in some things, such as body marks and the wearing of tails, various tribes have the same customs. The tail-wearing tribes are the Kagora, Ataka, Ganawari, Moroa, Katab, living north and north-east of Jemaan Daroro, and the Kaji and Jaba to the north-west of that place. The Ganawari are also cannibals. The tail is worn by married women only. It has various names according to the amount of decoration bestowed upon it (and here is the belle's only chance of coquetry), but "is in its most primitive form called *kunnok*, and this is in shape something like a mushroom, some being long and thin, others being short and stumpy." The information about these peoples is both new and valuable. There are excellent descriptions of some parts of the country visited, but no very clear general account of the topography of the region, and the sketch-map given affords no help in this direction. Good illustrations are given of the kunnoks, or tails, *in situ*.

'Hausa Superstitions and Customs' is a book primarily for the student, and is a very thorough and trustworthy piece of work. In a journal devoted to geographical subjects it does not call for detailed notice, but, as to divorce land and folk is contrary to nature, the reader whose interests may be chiefly geographical will still find this volume well worth study. It contains faithful renderings of one hundred folk-tales, gathered by the author himself from illiterate Hausa. A very noticeable feature of these tales is the prominent part played in them by animals and birds. The spider, it may be noted, is regarded as the most cunning of the inhabitants of the forest. To the tales given in full are added many variants and useful notes. In addition, the author devotes considerable space to the "characteristics and virtues" of the Hausa, and to the whole range of what may be called the religious beliefs of the pagans among them. The student of folk-lore will at once recognize the great value of Major Tremearne's work; but the author seeks also to convince the ordinary reader of the worth of the stories he has collected. He says, "a certain class of folk-lore is to a great extent an enunciation of folk-law." If besides the tales we include the proverbs, of which the Hausa have great store, we certainly begin to get an understanding of a people rather low yet in the scale of civilization, but destined to play a prominent part in the development of our West African dominions. It is of peculiar interest to find among the Hausa folk-tales parallels to many English and other nursery tales and to Biblical stories. The explanation of the widespread Tar Baby legend which the author gives is worthy of attention.

The figures in the text, illustrative chiefly of Hausa industries, are a valuable feature of the book. We may note, also, that the Hausa text of the folk-tales is shortly to be published as a companion volume. F. R. C.

AMERICA.

British Columbia.

'British Columbia: its History, People, Industries, and Resources.' Compiled by Henry J. Boam. Edited by Ashley C. Brown. London: Sells, Ltd., 118, Fleet Street, E.C. 1912. *Price* £5 5s.

A most extensive collection of information relating to Canada's Pacific Province is to be found in Sells' 'British Columbia.' The history is a good *résumé* of Bancroft and Walbran. Education, defence, harbours, shipping, forestry, railway development, are the work of the compiler, Mr. Henry J. Boam, who has made these subjects clear reading. The compiler would have supplied a better generalization of the geography had he made use of Métin's 'La Columbie Britannique' as the foundation of his descriptions of Vancouver island, Yale, the Kootenays, the Queen Charlotte archipelago, and the Coast District. Some of the special articles are of value, notably Mr. Hugh Savage's description of the great Northern Interior of the Province. The rest of the special articles are by men who know their subjects.

The book is well got up, the plates excellent, and the maps as good as can be expected in an essentially commercial publication. With the extensive railway development in progress the work will be soon out of date, but for the present as a book of reference it is to be recommended.

J. B. T.

POLAR REGIONS.

Second Arctic Expedition in the *Fram*.

'Report of the Second Norwegian Arctic Expedition in the *Fram*, 1898–1902. Vol. 1 to 2. Christiania: Videnskabs-Selskabet, 1907–1911.

Three out of the four volumes giving the results of Otto Sverdrup's long and fruitful expedition in the *Fram* are published. Owing to the death of Per Schei, the geologist of the expedition, a few years after his return, the editorship was entrusted to Dr. N. Wille. In the first volume is a report on the meteorology by Dr. H. Mohn. The observations, which are published *in extenso*, were taken every two hours in winter quarters, and every four at sea. A curious feature in the daily march of temperature is brought out by these figures, but one not unknown from other Arctic records. In the dark season with a clear sky, the daily minimum is by day and the maximum by night. In other months the ordinary daily period occurs. North winds were by far the most frequent in all months except June, but the observed number of some directions is too small to show the thermal character of the winds in question. While north winds account for 26·2 per cent. of the total frequency, 32·4 per cent. is accounted for by calms. These north winds were as frequent on the high land as in the fjords running north and south where the *Fram* spent three of her four winters. The amount of precipitation was small, but, as usual in polar climates, it was found impossible to measure it accurately.

There are two papers, one by Dr. A. G. Nathorst, on the fossil flora of Ellesmere Land, and there is a third with a map on the geological results by Carl Bugge. The glaciation of Ellesmere and Heiberg Lands has never been more intense than it is now, since the last great submersion of the land. No land unglaciated at present shows any indication of glaciation in the past.

There are three lengthy botanical contributions by Mr. H. G. Simmons, the Swedish botanist of the expedition, dealing respectively with the vascular flora of Ellesmere Land, that of North Devon, and the phanerogams and ferns of north-west Greenland. In both cases the author discusses collections previous

to his own, and takes a complete survey of the flora. Ellesmere Land, so far, has yielded 115 species, of which more than half (63 per cent.) are circumpolar, and some even from beyond Arctic regions. But apart from these, the Greenlandic aspect of the Ellesmere Land flora, contended for by Hooker, is not borne out. But yet Hooker's opinion holds true if the comparison is made, not with the flora of Greenland as a whole, but with that of the north-west, which contains a strong American element. In analyzing and discussing the relationships of the floras of north-west and north-east Greenland, Mr. Simmons notes that the only real difference between the two is the small Spitsbergen and European element in the latter, which is absent on the western side. This points to a land bridge between Greenland and Spitsbergen in the past, unless we can accept dispersal by birds. Winds and wave influence cannot be accepted as an explanation. The main difficulty in the way of bird carriers is that these species are found only in the northern part of the east coast, and not the south. But neither would a land bridge explain that anomaly in distribution. However, what lessens considerably the value of such discussions and speculations is, as the author admits, the incompleteness of data from these regions. More extensive collections must be made before such a discussion can be placed on a sound footing. Extensive bibliographies add greatly to the value of Mr. Simmons' papers. Dr. O. V. Darbishire, who reports on the collection of lichens, says it is the best of its kind ever brought back from Arctic regions, comprising as it does nearly 10,000 specimens. It is remarkable to find that 72·3 per cent. of the lichens of Arctic America, Greenland, Spitsbergen, and Iceland are also found in Tirol; in other words, they are also Alpine species.

Dr. F. Ingvarson has an important paper on driftwood. Most of it was collected in the western part of Jones sound, but stray pieces were found on the west and east of Ellesmere Land and in Cardigan strait. They were almost all of *Larix* and *Picea* with a very few *Populus* and *Salix*. The author discusses at length the origin of this driftwood, and decides that it comes, not from the St. Lawrence river, Hudson bay, or the Mackenzie river, but from Siberian rivers, probably from the Indigirka, the Kolyma, and other rivers in eastern Siberia. The Jones sound driftwood probably reaches that region by Davis strait and Baffin bay, like that on the south-west of Greenland. A long report on terrestrial magnetism is contributed by A. S. Steen, and Major G. Isachsen tabulates the astronomical and geodetical observations. A very considerable area of land was added to the map and was surveyed. There are three large coloured maps: One of the whole area of work (1 : 2,000,000), a second of the west end of Jones sound, and a third of Buchanan bay and Bache peninsula, the two latter on a scale of 1 : 200,000.

A number of zoological and other papers complete the volumes. Most of the memoirs are in English, a few in German, and at least one unfortunately is in Norwegian. The three volumes form a splendid record of a great amount of useful work. The expense of publication is borne by the Fridtjof Nansen Fund for the Advancement of Science.

R. N. R. B.

GENERAL.

'From Pole to Pole: a book for young people.' By Sven Hedin. Macmillan & Co., 1912. Pp. xiv., 408. *Sketch-maps and Illustrations. Price 7s. 6d. net.*

"Describe a journey from Stockholm to Constantinople, with notes on the large towns through which you pass." The type of question is familiar; one does not remember that scholars are as a rule enthusiastic over answering it.

It would be impossible, however, for any normal-minded boy or girl not to grow enthusiastic over Dr. Sven Hedin's description of this journey, and of the many others described in this book, which deals partly with the author's own travels, partly with the great feats of geographical exploration "from pole to pole."

As regards his own journeys, which occupy the first half of the book, the author has arranged the narrative in a geographical sequence, combining sections of his various journeys so as to describe practically the whole of Asia with the exception of Siberia. The ability to write such a description can be possessed by but few people; it would be almost as rare a thing to find an author who could make it so interesting. Whether by a brilliant geographical simile—*e.g.* Berlin, the "spider" on the railway map of Europe—by a story woven in as a piece of local colour, or by the vivid description of the journey itself, the story is sustained throughout at a pitch which never allows the interest to flag.

Many illustrations add variety to the text, and useful sketches are given at appropriate places.

THE MONTHLY RECORD.

ASIA.

The Great River-Valleys of South-East Tibet.—Mr. F. Kingdon Ward, whose journeys in 1911 amongst the high mountain ranges of the Yunnan-Tibetan borderland were described in the *Journal* last year (vol. **39**, p. 582), has summarised the results of his observations from the point of view of the physical geography in the *Geological Magazine* for April, 1912. The remarkable features of this region—the great river-valleys running side by side in independent but closely appressed courses—has long been a commonplace of geographers, and are even, according to Mr. Ward, recognized by the Tibetans in their designation of this tract as the "Land of deep corrosions" (Namgrog-chi). Mr. Ward endeavours to trace the causes which have led to this striking morphology, and in particular those which have brought about the marked differences between the several valleys. In fact, beyond saying that the main mountain ranges and valleys are clearly the results of crust movement, he confines himself mainly to the features due, in his view, to the local peculiarities in the distribution of the meteorological factors. The prevailing wind is the south-west monsoon, which drenches the parallel ranges between Assam and China from May to October. In about 28° N. the increase in their height causes the westernmost to act as a partial rain-screen to the next, and so on. The snowy range between the Irawadi and the Salwin checks the rainfall in the latter valley, on reaching which we pass from a region of dense forest to a semi-desert. The Salwin-Mekong divide is even higher, and the Mekong valley is, if possible, still further desiccated. The wind has now so little moisture left that even the next divide, as well as the Yangtse valley beyond, is arid. In the valleys themselves an upward current of air prevails, but this is a mere local phenomenon. The up-valley transition from luxuriant vegetation to semi-desert is extremely abrupt, especially in the case of the Salwin, and even the rain-clouds may be seen to stop short suddenly. Features which Mr. Ward ascribes to this climatic change are: the change in the Salwin valley from a U-shaped to a V-shaped cross-section; and the "reversed" character (in the arid region) of the tributary valleys, which gradually contract as they descend. The forms of the Salwin-Mekong divide contrast strongly

with those between the Mekong and Yangtse, the former showing the characteristic curve of water-erosion, the latter the effect (in towers and square-faced buttresses) of dry denudation by frost, wind, etc. Although the two divides are only 20 miles apart, the snow-line is at least 3000 feet higher on the western than on the eastern one, and even at the same altitude the snow disappears in spring much more rapidly on the latter. The Salwin-Mekong divide therefore experiences the conservative action of the snow-blanket, and as a much greater quantity of water is here available for transport, we do not see the vast accumulations of screes that occur on the Mekong-Yangtse divide. Similar rocks (limestone, granite, and metamorphic) are to be found in all three valleys, but there is a considerable difference between the divides in this respect, the western being capped by igneous rocks, the eastern by easily splintered limestone. Traces of former more extensive glaciation are to be seen on the Mekong-Yangtse divide, and the retreat of the ice may be ascribed to a diminution of the rainfall. Mr. Ward finds the cause of this in the uplift of the western ranges, causing them to form rain-screens; and sees evidences of a general tilt (denoting past instability) in the progressively greater elevation of the valleys from west to east. This, he thinks, may have resulted in a cracking of the crust, by which the valleys were originally formed.

AFRICA.

Mr. I. N. Dracopoli's Journey in East Africa.—Mr. Dracopoli, whose journeys in north-west Mexico were described by him at the British Association last year (see report in *Journal*, vol. **40**, pp. 511–518), has since carried out an important journey in one of the least-known parts of British East Africa, from which he has just returned. Leaving the coast at Kismayu, he struck inland in a zigzag course through the arid tract between the Juba and the Tana, making his way eventually to the Lorian swamp, and thence by a circuit to Mount Kenya and the Tana. The journey was thus somewhat similar, broadly speaking, to that of Mr. C. W. Haywood, described in the May number of the *Journal*, though the routes did not coincide. Mr. Dracopoli, who has received instruction under Mr. Reeves at the Society, appears to have done some excellent survey work, which will help to fill an important gap in the map of British East Africa. He will describe his journey to the Society at one of the meetings in June.

Sub-soil Water and Cotton Cultivation in Egypt.—Interesting researches into the effect of the level of the sub-soil water on the growth and yield of cotton have lately been carried out in Egypt under the auspices of the Survey Department, with the assistance of members of the staff of the Agricultural Department. The results are described by Messrs. H. T. Ferrar and H. E. Hurst in Survey Department Paper, No. 24 (Cairo, 1912). The experiments were the outcome of investigations into the movement of sub-soil water previously initiated by the Survey Department. They consisted in observations to determine (in a specially selected experimental area) the relation between the height of the water-table and the yield of cotton; a comparison of the height of the water-table and the yield of cotton at a number of places in the Delta; and a determination of the quantity of water actually flowing on to the land at the various waterings of the cotton crop. In the first case (known as the Gemmeiza strip experiment), cotton was grown on land under which there was a sloping water-table, the area being divided into plots, and the level of the sub-soil water determined by boring, while the weight of cotton yielded by each was also ascertained. It was proved that there is a steady increase

in the yield of cotton (as also of all the factors determining the magnitude of the crop) as the thickness of the layer of soil above the water-table increases. This result was fully confirmed by the second series of observations. At first the yield increases with the depth to the water-table, but after a certain depth, which varies with the locality, the yield tends to become constant. The general result is to show it to be probable that the height of the water-table is one of the most important of the causes which determine the magnitude of the cotton crop.

AMERICA.

A Record of the La Vérendryes' Visit to the Upper Missouri.—An interesting find has been made on the upper Missouri in the shape of an inscribed lead tablet, buried in the ground by La Vérendrye's sons during their bold journey of exploration in the direction of the Rocky mountains in 1742–43. It was found a few months ago by a schoolgirl, on a bluff overlooking the Missouri at Port Pierre, opposite the city of Pierre, the capital of South Dakota. We have received a copy of the Winnipeg *Free Press* of April 12, 1913, containing an account of the discovery and of the journey during which the record was buried, by Mr. C. N. Bell, together with reproductions of photographs of the two sides of the plate taken by Mr. W. O'Reilly, of Pierre. Readers of Parkman's historical works, or of more recent narratives of the early exploration of Western Canada, will remember that after a first visit, in company with their father, to the Mandan villages on the upper Missouri, La Vérendrye's two sons set out in 1742 on a new journey, in the hope of finding the much-desired way to the western sea by this route. They crossed the great river and pushed on a long distance in a south-westerly direction, entering into relations with various Indian tribes, and finally—so it appears—reaching the eastern foot of the Rocky mountains, though the exact route and distance traversed have been matters of much discussion. The obverse of the tablet (which is some 8 inches in width) bears the following inscription, regularly cut, surrounded by a border, and surmounted by the French royal arms: "Anno XXVI regni Ludovici XV, pro rege illustrissimo domino, domino Marchione de Beauharnois MDCCXXXXI Petrus Gaultier de Laverendrie posuit." Roughly cut with a knife on the reverse is the following: "Pose par le Chevalyer de LaVr, te [*i.e.* témoins] St. Louy la Londette A. Miotte, le 30 Mars 1743." It would seem that the plate was prepared before the expedition was undertaken, the date of the obverse being thus explained. That of the reverse corresponds with the stay of the travellers on the Missouri on their return from their bold venture, as is to be learnt from the journal kept by them, and still preserved at Paris in the official archives. Their object in leaving the record was, no doubt, to take official possession of the country explored in the name of the French king. The writer of the article says that there are a number of points in dispute regarding the route followed by La Vérendrye's sons, which will now be definitely settled. This seems to be something of an exaggeration, as the only point cleared up appears to be that of the spot at which the Missouri was struck on the return journey.

Climatic Changes in Mexico.—In the number for January, 1913, of the *Bulletin of the American Geographical Society*, Mr. Ellsworth Huntington discusses the evidences that are available in support of the view that decided climatic oscillations have occurred during historic times, and arrives at the conclusion that there is ground for the belief that the climate of Mexico has passed through fluctuations like those of Asia on the one hand, and of more northern regions in America, such as California and New Mexico, on the other

hand. He shows that the evidence adduced is in itself too slight to justify any conclusions that might be derived from it alone, but that it presents itself as a satisfactory test of a theory whose basis has been previously elaborated. In Mexico, historical and archæological investigations go clearly to show that the level of lakes has been subject to well-marked oscillations through the centuries, which, when allowance is made for other factors, natural or artificial, that may have altered the level, must argue variations in the rainfall. When the Aztec founders of the city of Mexico reached the shores of Lake Tezcuco about 1325 A.D., the level appears to have been much higher than it became soon after the Spanish conquest. The indirect indications of climatic change in Mexico go to support those obtained from a study of curves based on measurements of the growth of *Sequoia gigantea* in California, and the yellow pine in New Mexico. One of the most important methods of testing the theory under discussion is the occurrence or absence of the type of terraces which seem to be of climatic origin. Mr. Huntington has discussed this subject fully in previous works ('Explorations in Turkestan;' 'The Pulse of Asia') so far as it applies to Asia, and intends soon to discuss it with regard to America. In the paper under notice, he points out that in both Asia and America the drier, more rugged mountains of non-glaciated sub-tropical regions are full of alluvial terraces composed of gravel and silt ranging in height from ephemeral ones 5 feet high to enduring ones 1000 feet high. The only process yet suggested which adequately explains the terraces is climatic variation, causing the rate of erosion and weathering as well as the volume and velocity of the streams to change. Through the courtesy of Dr. José G. Aguilera, Director of the Geological Institute of Mexico, Mr. Huntington obtained facilities for visiting regions around the city where there are abundant terraces of the type which elsewhere appear to be "climatic." The constant occurrence of such terraces, from Utah on the north to southern Mexico on the south, strongly suggests similar pulsations of climate in the United States and in Mexico, although the phases of the changes may have differed in the two regions.

Dr. Hamilton Rice in the Upper Basins of the Orinoco and Amazon.—Further communications from this traveller (*Journal*, vol. 39, p. 492) have been received at the Society, together with the details of the observations carried out for map-making purposes, and some of the large-scale sheets on which the survey has been plotted. They show that Dr. Rice has already done some excellent work, and that, if successful in carrying out the rest of his programme, he is likely to supply really valuable data for the mapping of this little-known part of the South American interior. The first letter (undated) was written from San Martin, in the Intendencia del Meta, Colombia. It states that the traveller had then worked out a latitude and azimuth traverse, based on points determined astronomically, from Bogotá to that point, and was hoping to carry it on down the Ariari to the Guaviare, and thence to the Itilla. He had also carried out a prismatic compass survey, giving great attention to details of topography and physical geography, and this fitted in well with the other. His young Viennese companion, Lieut. Bauer, had been very ill with malaria, but was then on the road to recovery, and subsequently carried out a useful traverse of a portion of the Guaviare. The next letter is dated San José, Rio Guaviare, January 6, 1913, and gives a graphic account of a trying journey south from that point to the Ajaju river (a branch of the Apaporis, a stream which takes an intermediate course between the Uaupes and Caqueta or Yapura) and back. At San Martin Dr. Rice had been delayed

through the necessity of operating on a native suffering from anthrax, who made a good recovery. In July he went down the Ariari and established a base at San José, and next month went on to Calamar (near the source of the Uaupes). The trail was in a fearful condition, and the cost and trouble of transporting the telescope along it in hopes of getting an occultation was in vain, owing to the constant cloudiness. Over 150 other good observations had, however, been obtained. At the Itilla river some fifty observations were taken, while preparations were being made for a farther advance. This was begun at the end of September with a party of twenty-two, including seven Indians. At the Tutuya river a raft was made, and a path cut to the Macaya river. Here Dr. Rice performed an operation for abscess of the liver on an Indian—probably the first surgical operation under chloroform carried out in this primeval wilderness, with all the aseptic technique of hospital routine. The patient was, however, in a moribund condition at the time, and succumbed four days later. Beyond the Macaya a sierra, reaching somewhat over 3000 feet, blocked progress. The highest peaks rose in impressive perpendicular crests and aiguilles from hills which Dr. Rice describes as "dissected and weathered into impassable barriers of precipitous cliffs, ravines, cañons, chasms and gorges. Some measured over 150 feet deep, barely 5 feet wide at the top in places, and broadening out at the bottom, with caves of immense size." Tracks of anacondas were seen, but other animal life was absent, though abundant on either side of the range. This is known to the natives as Chiribiquete. The men had now become worn down by fever, and were unwilling to proceed, matters at last coming to open mutiny. Dr. Rice, however, pushed on to the Ajaju with the Indians, and having secured observations there, began the retreat. In great straits for food, and hindered by daily rain, the party struggled back by forced marches to the Macaya, before reaching which it had been necessary to abandon everything but the theodolite. At San José Dr. Rice found that one of his canoes had been destroyed, but he obtained another, and, on securing a full crew, he proposed to begin the descent of the Ynirida *en route* for San Fernando de Atabapo, making trips also southward to the Guainia. He reports having made interesting observations on the prophylaxis of malaria, and having discovered the cause of the "peste" of that region in a trypanosome. The last letter, dated January 15, speaks of difficulties encountered in recruiting a crew for the intended voyage, and of much trouble with the canoes.

Astronomically fixed Positions in Dutch Guiana.—The first number for 1913 of the *Tijdschrift* of the Royal Netherlands Geographical Society contains a brief account of work done in 1911–12 by Captain A. J. van Stockum, under the orders of the Surinam Government, for the astronomical determination of a number of positions in the northern parts of the colony, both on the coast and for some distance towards the interior, principally on the courses of the rivers. The determinations were made by star-observations, the latitudes being obtained by circum-meridian altitudes of stars, chosen as far as possible at equal elevations north and south of the zenith, and observed at as short intervals as possible. The longitudes were obtained by meridian distances between pairs of stations, three sets of observations being taken at each pair, the first and third at the one station, the second at the other, again with as short an interval as possible between them. In order to eliminate constant errors, the series of observations were made as similar as possible on each occasion, the same star being observed on the same side of the meridian and at more or less equal altitudes. In the case of Paramaribo, a *direct* determination of longitude was

effected by altitudes of the moon, which was considered to give Greenwich mean time more accurately than a lunar distance. The value obtained was 55° 12′ 13″ W., which is some 3′ in excess of that generally adopted, for which Captain Stockum considers it should be substituted. In the next (March) number of the *Tijdschrift*, however, Mr. P. W. Sachse holds that the value 55° 8′ 47″ obtained by the *Suriname* of the Dutch navy in 1886 is to be preferred. He gives details of the observations on which that result was based, the method being that of meridian distances between Paramaribo on the one hand, and Barbados and Martinique on the other. The close accordance in the two cases, he says, gives confidence in the result. Other values obtained by ships of the Dutch navy at various dates between 1877 and 1887 are all less than 55° 10′ W., or more than 2′ less than Captain Stockum's figure.

AUSTRALASIA AND PACIFIC ISLANDS.

Dutch Exploration of the Central Range of New Guinea.—The expedition into the southern interior of Dutch New Guinea by way of the "Eilanden" river, carried out in 1910-11 by a detachment under Captain Schaeffer (cf. *Journal*, vol. **38**, p. 536), resulted in valuable additions to the knowledge of the great central range, east of the portion explored by Dr. H. A. Lorentz. The party included, as surveyor, Naval-Lieut. F. F. van der Ven, who describes the work accomplished in the *Tijdschrift* of the Royal Netherlands Geographical Society for March, 1913. The mountains from which the Island river receives its supplies do not reach the limit of perpetual snow, but from this very reason it was hoped to push farther by this route into the heart of the range; and although circumstances compelled a return before the programme had been carried out in full, the bearings obtained of the various peaks in the range, extending to the snow-clad Juliana Top in the east, permitted their positions to be determined with some accuracy, and the general form of the ridges to be sketched in on the map. The mountains are characterized, here as elsewhere, by the excessive steepness with which they rise from the coast lowland, and by the depth and narrowness of the ravines. This made the advance a matter of great difficulty, and it was only after several vain attempts that the party reached the summit of an outlier of the range—named by them "Goliath," while a smaller ridge to the south received the name "David"—which, being bare of forest, gave a complete panorama of the southern side of the mountains. Its altitude was about 3500 metres (11,500 feet), and the vegetation consisted only of stunted trees and bushes, which gave no protection against the icy winds. On the more sheltered slopes the growth was higher, and many orchids were seen. The temperature range was here enormous, falling as low as 2° or 3° C. (35·6° to 37·4° F.) at dawn, while in the daytime the sun shone with intense power when once the clouds were dispersed. Usually the peak appeared like an island in a sea of clouds, from which the distant peaks and ridges stood out like islands and peninsulas. The fauna consisted of little beyond insects and small birds. After the intense radiation of a clear night, all the surrounding peaks above 4200 metres (13,800 feet) showed a covering of snow, which disappeared in the course of the day except in the case of one peak—the highest in the "Moon" range, from which the snow never entirely vanished. Its height was about 4500 metres (15,000 feet), which thus appears to be just above the limit of perpetual snow. It was named "Prins Hendrik Top." The writer enters into some detail regarding the methods

adopted for fixing positions by intersections, etc. For longitude, the chronometers were not to be depended on after the usage to which they had been subjected in the mountains, and suitable angles to certain parts of the range could not be obtained. The difficulty was got over by establishing an artificial beacon at a subsidiary station outside the mountains. As regards the mountain people met with, two settlements were seen, one to the south-west, the other to the north of Mount Goliath. The medical officer, A. C. de Kocq, secured valuable anthropological data from the first, but the people of the second long resisted all efforts to come into touch with them. Only just before the return were friendly relations established with two individuals.

POLAR REGIONS.

Norwegian Researches in Spitsbergen.—The work of the Norwegian Expedition of 1911 under Messrs. Hoel, Staxrud, and others, was referred to in the *Journal* for February, 1912 (vol. **39**, p. 162). The party continued its labours during 1912, with but a slight change in its *personnel*, and was able to complete its topographical and geological investigations in the west and north-west of the main island. An account of the second season's work, with a general summary of the results, is given by Captain Staxrud and Mr. Hoel in the February number of *La Géographie* for the present year. Two detachments, under Captain Staxrud and Mr. Koller respectively, were occupied with the survey of the peninsula between Ice fiord in the north and Bell sound and Van Mijen bay in the south. This had previously been mapped in somewhat rough outline only, even in the vicinity of the coasts, and it was desired to execute a survey of the whole area sufficiently precise to serve not only as a basis for its scientific exploration, and as a guide to navigators, but as a help towards the delimitation of present and future mining concessions. It was necessary to carry out the survey as rapidly as possible, and the method adopted to this end was that of a triangulation by means of light theodolites, with photogrammetric work for the filling in of detail. The triangulation was controlled by the measurement of a base in the neighbourhood of Coles bay, with an invar wire 24 metres long. Thence the network of triangles was extended west to Green harbour, south across the glacier towards Bell sound, and north-east along the Stordal or Great valley, the circuit closing at Mount Nathorst, whose position, as fixed from the two directions, differed by about 1½ metres only. The work was plotted on the scale of 1 : 50,000, and contours were drawn in at intervals of 50 metres. While this work was in progress, Mr. Hoel, assisted by Messrs. Watnelie and Ellingsen, proceeded north to Wood bay, stopping *en route* at King's bay and exploring the lower part of the great glacier which debouches there, as well as at Cross bay, where the positions of the stones previously placed in lines on the surface of the Lilliehöök glacier were determined. During the first half of August geological work was done around Wood bay and its branches, and towards the end of the month the explorers continued their researches on Wijde bay. Its western branch, West fjord, was found to be 10 nautical miles shorter than had been supposed. It was found that the fossil-bearing strata of Silurian and Devonian age, principally composed of sandstones, attain an enormous thickness in this region, estimated at something like 10,000 metres. A detailed map was made of the thermal massif of Rock bay, and collections of the southern flora of the hot springs were secured. A series of volcanic necks or volcanoes in embryo was discovered, apparently of Quarternary age. The presence of *Mytilus edulis* in the alluvial deposits showed that Spitsbergen has enjoyed a milder climate than the present since the glacial epoch.

The Disastrous German Expedition to Spitsbergen.—The anxiety which has been felt for the safety of Lieut. Schröder-Stranz and his companions (*ante*, pp. 171, 289) seems to have been only too well justified. Captain Staxrud (see previous note), the leader of the relief expedition lately organized, reported from Advent bay on May 14 that three members of the expedition are dead, and four, including the leader, are missing. Only three are known to be living, viz. Captain Ritschel, Dr. Rüdiger, and Herr Rave. The two last were rescued on April 20 from the hut on Wijde bay, and were brought to Advent bay after enduring great suffering and privation. Nothing has been heard of Lieut. Schröder-Stranz since he left his ship last August at Treurenberg bay to go north on a sledge expedition. Of the members known to be dead, two are reported drowned.

The Crocker Land Expedition.—This American expedition, which was to have started last year under the leadership of the late George Borup, but was postponed until 1913 owing to his lamented death, has now been completely re-organized, and, according to present plans, is to start north during July. The new leader, as already announced in the *Journal*, is Mr. D. B. Macmillan, originally associated with Mr. Borup as co-leader, who has devoted his entire time during the past year to further fitting himself for the task to be carried out. He has undertaken special studies at Harvard in anthropology, practical astronomy, and meteorology, and is besides an expert ornithologist. Capable assistants have been found in the following, rendering the staff of the expedition unusually competent for the work to be done. Ensign Fitzhugh Green, U.S.N., has been detailed from the U.S. Navy Department for special duty in the direction of mapping, electrical work (including the supervision of the wireless apparatus which is being taken), terrestrial magnetism, and seismology. He has lately made special studies in connection with the expedition at George Washington University. Mr. W. E. Ekblaw, a graduate of the University of Illinois, has been appointed geologist of the party, and will have charge too of the botanical work. He is also an expert ornithologist. Dr. M. C. Tanquary, also a graduate of the same university, will be the zoologist, and though devoting himself particularly to the invertebrate zoology, will pay attention too to the fishes and birds, in which he has had special instruction. An expert electrician has been detailed from the Navy Department, and there is a first-class mechanic and cook. It is hoped to secure a suitable surgeon before the party sails. The national character of the expedition has been enhanced by the co-operation of various Government Departments, and of a number of universities and colleges, as well as of important commercial houses. Apart from contributions in kind, more than $50,000 has been raised in cash, and the party will start as well if not better equipped than any previous American Arctic Expedition.

Rasmussen's Expedition in Northern Greenland.—News was received in Copenhagen early in May of the successful completion of the expedition to Northern Greenland undertaken last year by the well-known explorer Knud Rasmussen, after being abandoned in 1911 owing to unfavourable circumstances (cf. *Journal*, vol. **38**, p. 538). With his Danish companion Freuchen and two Eskimo, Rasmussen started on April 6, 1912, from Markham glacier on the west coast, and crossing the inland ice with four sledges and fifty-three dogs, descended to the east coast at Danmark fiord. The dogs being still in good condition, it was decided to go west through the supposed Peary channel, the non-existence of which had already been proved by Mylius Erichsen, though this was, of course, not known until Mikkelsen's return last autumn after finding his predecessor's record. In Peary Land seals and musk oxen were found in

large numbers and provided ample supplies of food. Following the coast to the bottom of Independence bay, where it had been supposed to narrow to form Peary channel, the explorers found a large tract of ice-free land, with plenty of game. A month's stay was made here amidst continuous storms, after which the return journey over the ice—a distance of 600 miles—was commenced, and completed by September 15 at the average rate of 31 miles per day. Rasmussen reports that he depended throughout altogether on his Eskimo outfit, no tinned provisions being carried.

Mr. Stefansson's New Expedition.—Mr. Stefansson has secured for his new venture the co-operation of several Scottish scientific experts, including Dr. A. Forbes Mackay and Mr. W. L. McKinlay, the former a member of Sir E. Shackleton's Antarctic Expedition, and one of the party which reached the South Magnetic Pole. They were accorded an enthusiastic send-off on sailing from Glasgow by the Allan liner *Grampian* at the end of April. Another member of Mr. Stefansson's staff is Mr. James Murray, well known for his work as biologist on the Scottish Lochs survey and on Sir E. Shackleton's Expedition, who sailed from Southampton on April 27, having been prevented at the last moment from joining the *Grampian*.

Amundsen's Arctic Expedition.—Further details respecting Captain Amundsen's plans for his proposed drift across the North Polar basin have lately been made public. He has been fortunate in securing a grant of $20,000 (£4000) from the National Geographic Society of Washington, which, with the still larger contribution from the Norwegian Geographical Society and other resources, places the undertaking on a thoroughly sound footing financially. In making this grant the American Society lays special stress on the valuable results to be expected from the soundings and samples of the ocean bottom to be taken along the route of the drift, from the meteorological records, and from the proposed series of magnetic observations. Amundsen proposes to leave the Pacific coast during the summer of 1914, the *Fram* being brought up from Buenos Aires by the Panama canal, and finally provisioned at some Pacific port. In accordance with the original programme, she will enter the Polar sea through Bering strait, and, taking advantage of the Arctic drift, be carried, if the expectations are realized, over or very near the North Pole towards the Greenland sea. The voyage is expected to last about five years, and the personnel and equipment will be practically the same as were employed on the Antarctic voyage. Amundsen has long been a member of the National Geographic Society, and received its Hubbard medal for his achievement of the North-west Passage, and a special gold medal for the conquest of the South Pole.

The Antarctic Disaster: Government Provision for the Dependents of the Victims.—A letter from the Prime Minister to the Lord Mayor, dated April 29, 1913, describes the measures which the Government proposes to adopt with a view to providing for the dependents of Captain Scott and the companions who lost their lives with him in the Antarctic. It is intended to ask Parliament to sanction a special vote sufficient to provide as follows. For Lady Scott (in addition to the Admiralty pension of £200 per annum for herself and £25 per annum for her son until he reaches the age of eighteen), an annuity of £100. For Mrs. Scott, the mother, and Mrs. Campbell and Miss Grace Scott, the sisters, of Captain Scott, a joint annuity of £300. For Mrs. Wilson, the widow, and Miss Mary Souper, the sister-in-law, of Dr. E. A. Wilson, a joint annuity of £300. For Mrs. Evans, the widow of Petty-Officer E. Evans (in addition to the pension and allowances awarded to her by the Admiralty, amounting to 13*s.* 6*d.* a week), a further annuity of 12*s.* 6*d.* a week for herself

and 3*s*. a week in respect of each of her children up to the age of eighteen. The Government of India, in whose service Lieut. Bowers was before joining the expedition, has offered to provide for his mother and sisters pensions amounting in all to £100 per annum. The omission of any mention of relatives of Captain Oates is doubtless due to the fact that this officer was possessed of ample means and was unmarried.

Honour for Commander Evans.—We are pleased to record the honour conferred by the King on Commander Evans, in the bestowal of the C.B. in recognition of his services with the Antarctic Expedition. Commander Evans was received by the King at Buckingham Palace on May 16.

Dr. Mawson's Expedition.—News received in Australia from Dr. Mawson early in May, by wireless, stated that the members of the party were then well, and were collecting valuable data at their base. The hut was practically snowed up, and the penguins and seals had disappeared shortly before the bay became frozen over, only the Antarctic snow petrels then remaining. The first number of a newspaper named the *Adelie Blizzard* had been published. As regards the work accomplished by the expedition down to the final departure of the *Aurora* (see Captain Davis's report, *ante*), an appreciation by Prof. David appeared in the Sydney *Daily Telegraph* for March 24, which reported the arrival in Sydney of eight members of the expedition, including Mr. Frank Wild, leader of the western wintering party. Prof. David says that, from the charts brought back by Captain Davis, it is obvious that the prolonged work of the various branches of the expedition ashore and afloat has led to the accurate delineation of approximately 1000 miles of new coast-line, while at intervals geological specimens have been obtained from rocky islets and promontories emerging from the ice. The actual presence of rock foundations was determined in the neighbourhood of nearly the whole coast explored, so that previous errors as to the position of the coast-line, due to the mistaking for it of pack-ice edges or fleets of icebergs, have in this case been avoided. Prof. David also bears witness to the foresight evinced by the leader in providing for the safety of those under his charge, and to the bravery and resource of Captain Davis in carrying out the rescue of Wild's party in the trying circumstances described in the report printed in the present number. The voyage made for that purpose will remain, he says, one of the most brilliant achievements in the history of Antarctic navigation.

HISTORICAL GEOGRAPHY.

Bartholomew Dias's Farthest East.—The question of the farthest point reached by this Portuguese navigator on the coast of South Africa, during his famous voyage of 1488, has been discussed by Prof. E. H. L. Schwarz in a communication to the *South African Journal of Science* for December, 1912, a reprint of which has been received. The inquiry was suggested by the recent antiquarian find at the mouth of the Kowie, described by Prof. Schwarz in the *Journal* some three years ago (vol. **36**, p. 366). An image, supposed to represent the Virgin, which had been dug up at that locality, was there figured. The idea that this find might be in some way connected with the early Portuguese voyages not unnaturally occurred to Prof. Schwarz, who, on looking up the early accounts that have come down to us, in the light of a knowledge of the geography of this coast, came to the conclusion that the Kowie, and not the Fish river, as has generally been supposed, may have been the terminal point of Dias's voyage. This is, no doubt, a tempting hypothesis in view of the discovery of the image, but the early accounts are so conflicting that any

conclusion reached can at best be most uncertain. Whereas Duarte Pacheco (in the 'Esmeraldo de Situ Orbis'), and after him Barros, placed the Penedo das Fontes (Rock of the Fountains) of Dias, at which a cross was said to have been erected, at the Ilheos da Cruz (or St. Croix islands), Perestrello, who surveyed the coast in the century after Dias's voyage, placed the Penedo das Fontes off the mouth of the Kowie—an identification which has this in its favour—that this part of the coast certainly offers better facilities than most for watering a fleet. But even Perestrello does not make this the terminal point of the voyage, but places the Rio Infante 15 leagues farther east. Prof. Schwarz thinks that the association of the Penedo das Fontes with the Ilheos da Cruz may have arisen from the fact that a cross was set up at both localities. In his view, the second cross or pillar, said to have been set up at or near a sandy cliff identified with Cape Padrone, was probably erected on one of the dunes near the Kowie, where the landing is easier, and where a pillar for the guidance of shipping has, in fact, been put up within recent times. It will be seen that speculation enters largely into the whole discussion, and this, no doubt, is hardly to be avoided.

GENERAL.

Obituary of Major-General Clerk.—In our notice of Major-General Henry Clerk in the April number, the surname was accidentally mis-spelled Clark throughout, the correct spelling being as above.

MEETINGS OF THE ROYAL GEOGRAPHICAL SOCIETY, SESSION 1912–1913.

Twelfth Meeting, April 28, 1913.—The Right Hon. Earl Curzon of Kedleston, G.C.S.I., G.C.I.E., etc., in the Chair.

Elections.—*Richard Beaumont; Mrs. Ellen Spry Blount; Frank Alfred Butterfield; W. B. Cabot; Bernard J. S. Cahill; Miss Marion Elizabeth Campbell; Mrs. Margaret Amy Chambers; Gregory Hall Chilcott; John James Burke Cole; R. Montagu Davison; Captain W. J. Donohue, R.N.R.; J. de Grey Downing; Mrs. Frances Draper; Miss Rosette Dugdale; Miss M. Sophia Farrer; Miss Agnes S. Fox; Herbert Otto Frind; Mrs. Margaret Greer; Alexander Gross; Mrs. Stella Grove; Major Charles Frederick Harold; Miss Mary Heape; Rev. Meyer Hermann; Lady Lever; the Earl of Lonsdale; Miss Frances Brewer Lysnar; William E. Frank Macmillan; Frederick Johannes Mehnarto; Charles H. Moore; James Moore; Sir Juao B. Mascarenhas de Moraes; Right Hon. Lord Newborough; Miss Bertha Nicoll; Lady M. M. Owen-Mackenzie; Dr. Felix Oswald; Charles Pasco; Mrs. Louisa Radcliffe; George Hampton Rhodes; Miss Margueritte Robey; Dr. Th. Bruno Steinhorst; Frederick Charles Stewart; H. Dawes Swan; Rev. Duncan Travers; Gilbert Waterhouse; Lieut.-Colonel James W. Woods.*

The paper read was:—

"400th Anniversary of the Discovery of the Pacific Ocean by Vasco Nuñez de Balboa." By Sir Clements R. Markham, K.C.B., F.R.S.

Thirteenth Meeting, May 5, 1913.—Major Leonard Darwin, Vice-President, in the Chair.

Elections.—*Mrs. Florence M. Bowyer-Bower; Miss Elinor Busk; Rowland Woode Cater; Henry Cust; Frederic Eastmead; Vyvyan Robert Hans Eckford;*

Robert Joseph Flaherty; Sir C. Fortescue-Brickdale; Albert Arthur Foster; Rev. Alexander Francis; Mrs. James Huddart; Stanley A. Scott Kingsmill; Walter Roderick Lanham; Lorne S. MacThail; Captain Frank R. McCoy; Mrs. Louisa Duff McCoy; George Mixter; Ernest Noel; T. P. M. O'Callaghan; Lieut. J. B. Somerville, R.G.A.; Miss Grace Warner; John Bouring Wimble; R. Caton Woodville.

The paper read was:—

"Frontier Work on the Bolivia-Brazil Boundary." By Captain H. A. Edwards.

RESEARCH DEPARTMENT.

April 24, 1913.—Dr. A. STRAHAN in the Chair.

1. "An English Desert." By Alan G. Ogilvie.
2. "Monte Bello Islands" (off N.-W. Australia). By P. D. Montague.

GEOGRAPHICAL LITERATURE OF THE MONTH.

Additions to the Library.

By EDWARD HEAWOOD, M.A., *Librarian*, R.G.S.

The following abbreviations of nouns and the adjectives derived from them are employed to indicate the source of articles from other publications. Geographical names are in each case written in full:—

A. = Academy, Academie, Akademie.
Abh. = Abhandlungen.
Ann. = Annals, Annales, Annalen.
B. = Bulletin, Bollettino, Boletim.
Col. = Colonies.
Com. = Commerce.
C.R. = Comptes Rendus.
E. = Erdkunde.
G. = Geography, Géographie, Geografia.
Ges. = Gesellschaft.
I. = Institute, Institution.
Iz. = Izvestiya.
J. = Journal.
Jb. = Jahrbuch.
Jber. = Jahresbericht.
k.k. = kaiserlich und königlich.
M. = Mitteilungen.
Mag. = Magazine.
Mem. (Mém.) = Memoirs, Mémoires.
Met. (mét.) = Meteorological.
P. = Proceedings.
R. = Royal.
Rev. = (Riv.) = Review, Revue, Rivista.
S. = Society, Société, Selskab.
Sc. = Science(s).
Sitzb. = Sitzungsbericht.
T. = Transactions.
Ts. = Tijdschrift, Tidskrift.
V. = Verein.
Verh. = Verhandlungen.
W. = Wissenschaft, and compounds.
Z. = Zeitschrift.
Zap. = Zapiski.

On account of the ambiguity of the words *octavo*, *quarto*, etc., the size of books in the list below is denoted by the length and breadth of the cover in inches to the nearest half-inch. The size of the *Journal* is 10 × 6½.

A selection of the works in this list will be noticed elsewhere in the "Journal."

EUROPE.

Adriatic. **International Adriatic Commission.**

Commissione Internazionale Permanente per lo studio dell' Adriatico: Bollettino delle Crociere Periodiche. Ricerche Italiane, eseguite dal R. Comitato Talassografico. Fasc. 1: Osservazioni fatte durante le 3 crociere della R.N. "Ciclope" (1911). Venice, 1911. Size 13½ × 9½, pp. 54. *Maps.*

Ægean—Sponge fishery. *B.S.G. Italiana* V., 2 (1913): 24–40. **Martelli.**

La pesca e l'industria delle spugne nelle Sporadi meridionali. Del dott. Alessandro Martelli.

Alps—Pilatus. **Weber.**

Der Pilatus und seine Geschichte. Von P. X. Weber. Lucerne: E. Haag, 1913. Size 8 × 6, pp. xx. and 380. *Map and Illustrations. Price 5s.*

Austria—Population. *G.Z.* **18** (1912): 682–696. **Marek.**

Geographische Ergebnisse der Volkszählung in Oesterreich von 31. Dezember 1910.

Austria—Salzburg—Climate. **Fessler.**

Klimatographie von Oesterreich. Herausgegeben von der Direktion der k.k. Zentralanstalt für Meteorologie und Geodynamik. V. Klimatographie von Salzburg. Von Dr. A. Fessler. Vienna, 1912. Size 11 × 7½, pp. 88. *Map.*

Austria—Seismology. **Conrad.**

M. Erdbeben Komm., K.A.W. Wien, N.F. No. **44** (1912): pp. 22.

Die zeitliche Verteilung der in den Jahren 1897 bis 1907 in den österreichischen Alpen- und Karstländern gefühlten Erdbeben (ein Beitrag zum Studium der sekundär auslösenden Ursachen der Erdbeben). (II. Mitteilung.) Von Dr. Viktor Conrad. *Diagram.*

Balkan Peninsula. **Grothe.**

Durch Albanien und Montenegro. Zeitgemässe Betrachtungen zur Völkerkunde, Politik und Wirtschaftswelt der westlichen Balkanhalbinsel. Von Hugo Grothe. Munich: Martin Mörikes Verlag, 1913. Size 9 × 6½, pp. 224. *Sketch-maps and Illustrations. Price M.5. Presented by the Publisher.*

Balkan Peninsula. **Vischer.**

An der Serbischen Front. Erlebnisse eines Arztes auf dem serbisch-türkischen Kriegeschauplatz, 1912. Basel: Spitlers Nachfolger, 1913. Size 9 × 6, pp. 156. *Illustrations. Presented by the Author.*

Balkan States. *National G. Mag.* **23** (1912): 1149–1157. **Bryce.**

Two possible solutions for the Eastern problem. By James Bryce. *Sketch-map and Illustrations.*

Central Europe—Frontiers. *G. Teacher* **6** (1912): 335–346. **Butler.**

The frontiers of Central Europe and their defence. By Ralph Butler. *Sketch-maps.*

Denmark—Geodesy. **Petersen.**

Den Danske Gradmaaling; Ny Række, Hefte Nr. 9. Vandstandsmaalingen, normalhøjdepunktet for Danmark, sammenligning af Prøjsiske og Svenske nivellementskoter med Danske, M.M. Udgivet af Generalmajor V. H. O. Madsen; bearbejdet af Oberstløjt. N. M. Petersen. Copenhagen, 1912. Size 11 × 9, pp. v. and 156. *Map and Plans.*

Færoes. **Küchler.**

Die Færöer. Studien und Wanderfahrten. Von Karl Küchler. Munich: Georg Müller, 1913. Size 8½ × 5½, pp. xviii. and 302. *Map and Illustrations. Price 6s. 4d.*

France—Regions. **Bloch and others.**

Les divisions régionales de la France. Leçons faites à l'École des Hautes Études Sociales. Par MM. Camille Bloch, L. Lafitte, J. Letaconnoux, M. Levainville, F. Maurette, P. de Rousiers, M. Schwob, C. Vallaux, P. Vidal de la Blache. (Bibliothèque générale des Sciences Sociales, **47**.) Paris: Félix Alcan, 1913. Size 8½ × 5½, pp. 260. *Price 5s.*

France—South coast. **Beauvais.**

La côte d'Azur de Marseille à San Remo. Par Gaston Beauvais. (Collection des Guides-Joanne.) Paris: Hachette et Cie., 1913. Size 6½ × 4, pp. 235. *Maps, Plans, and Illustrations. Price 5 fr. Presented by the Publishers.*

France—South coasts. *Ann. I. Océanogr. Paris* **4** (1912): Fasc. 6; pp. 68. **Thoulet.**

Étude bathylithologique des côtes du Golfe du Lion. Par J. Thoulet. *Maps (in portfolio) and diagrams.*

France—Hérault—Coast. **Sudry.**

Ann. I. Océanogr. Paris **1** (1910): Fasc. 10, pp. 210.

L'Étang de Thau: essai de monographie océanographique. Par Louis Sudry. *Map.*

France—Geology. *Ann. Hydrographiques* (2 Sér.) **30** (1908–1910); 53–78. **Thoulet.**
Étude des fonds marins de la baie de Seine. Par M. G. Thoulet. *Map.*

Germany. **Lichtenberger.**
The evolution of modern Germany. By Henri Lichtenberger. London: Constable & Co., 1913. Size 9 × 6, pp. xxvi. and 440. *Price* 10*s.* 6*d. net. Presented by the Publishers.*

Germany—Elbe. **Linde.**
Die Niederelbe. Von Richard Linde. Vierte Auflage. (Land und Leute: Monographien zur Erdkunde, 28.) Bielefeld und Leipzig: Velhagen und Klasing, 1913. Size 10 × 7, pp. 202. *Map and Illustrations. Price M.4.*
The first edition appeared in 1908.

Germany—Palatinate. **Häberle.**
Die natürlichen Landschaften der Rheinpfalz; ein Beitrag zur pfälzischen Heimatkunde. Von Dr. Daniel Häberle. Verlagsabteilung des Pfälzerwald-Vereins. Kaiserslautern: H. Kaysers Verlag, 1913. Size 9 × 6, pp. viii. and 66. *Map and Illustrations. Presented by the Author.*

Greece—Historical. *B.G.S. Philadelphia* **19** (1912): 145–166, 199–223. **Hyde.**
Thessaly and the Vale of Tempe. By Dr. Walter Woodburn Hyde. *Illustrations.*

Iceland—Sagas. **Craigie.**
The Icelandic Sagas. By W. A. Craigie. (The Cambridge Manuals of Science and Literature.) Cambridge: University Press, 1913. Size 6½ × 5, pp. viii. and 120. *Map and Facsimiles. Price* 1*s. net. Presented by the Publishers.*

Italy. **Maurel.**
Little Cities of Italy. By André Maurel. Translated by Helen Gerard. [Second series.] New York and London: G. P. Putnam's Sons, 1913. Size 8 × 5½, pp. xvi. and 475. *Illustrations. Price* 9*s. net. Presented by the Publishers.*

Italy, Northern—Climate. *Mem. G., Riv. G. Italiana* **7** (1913): 3–192. **Anfossi.**
Materiali per la climatologia d'Italia. III. La pioggia in Piemonte e nelle Alpi Occidentali. Memoria di G. Anfossi. *Maps.*

Italy—Ravenna. **Hutton.**
Ravenna: a study. By Edward Hutton. Illustrated . . . by Harald Sund. London and Toronto: J. M. Dent & Sons, 1913. Size 8 × 6½, pp. xii. and 300. *Sketch-maps and Illustrations. Price* 10*s.* 6*d. net. Presented by the Publishers.*

Mediterranean—Cyprus. **Lukach and Jardine.**
The Handbook of Cyprus. 7th issue (1913), revised and edited by Harry Charles Lukach and Douglas James Jardine. London: E. Stanford, Ltd., 1913. Size 7½ × 5, pp. xi. and 308. *Map, Plans, and Illustrations. Price* 5*s. net. Presented by the Publishers.*

Mediterranean—Gravity. **Venturi.**
Atti R.A. Lincei; Ser. V.; Rendiconti Sc. fisiche **21** (1912): 2 Sem., 548–559.
Determinazioni di gravita relativa in Tunisia e a Malta nel 1908. Di A. Venturi.

Norway—Fjords. *Geol. Mag.*, Dec. V., **10** (1913): 9–14. **Hull.**
The physical history of the Norwegian Fjords. By Dr. Edward Hull.

Norway—Geodesy. **Norwegian Geographical Survey.**
Geodætiske Arbeider. Hefte 1: Præcisionsnivellement og Signalnivellementer. Utgit av Norges Geografiske Opmaaling. Christiania, 1912. Size 12 × 9, pp. 96. *Maps and Illustrations.*

Spain and Portugal. **Baedeker**
Spain and Portugal. Handbook for travellers, by Karl Baedeker. 4th edit. Leipzig: Karl Baedeker (London: T. Fisher Unwin), 1913. Size 6 × 4, pp. xcviii. and 594. *Maps and Plans. Presented by the Editor.*

United Kingdom—England. **Law**
The story of Bradford. By Margaret C. D. Law. London: Sir Isaac Pitman & Sons, [1913]. Size 7½ × 4½, pp. xii. and 305. *Plans and Illustrations. Price* 2*s. net. Presented by the Publishers.*

United Kingdom—Hereford. **Bradley.**

Cambridge County Geographies (edited by Dr. F. H. H. Guillemard). Herefordshire. By A. G. Bradley. Cambridge: University Press, 1913. Size 7½ × 5, pp. xii. and 150. *Maps, Illustrations, and Diagrams.* *Price* 1*s.* 6*d.* *Presented by the Publishers.*

United Kingdom—Road Book. **Gross and Waite-Brown.**

Premier Road Book of Great Britain, with over 400 plans and contours. By Alexander Gross and F. Waite-Browne. London: "Geographia" Ltd., [1913]. Size 7 × 4½, pp. 192. *Plans and Sections.* *Price* 1*s. net.* *Presented by the Publishers.*

Much on the lines of Inglis's well-known road-books, though more condensed.

United Kingdom—Scotland. **Hannah.**

The Berwick and Lothian Coasts. By Ian C. Hannah. With 65 illustrations by Edith Brand Hannah. (The County Coast Series.) London: Fisher Unwin, 1913. Size 8 × 5½, pp. 368. *Plans and Illustrations.* *Price* 6*s. net.* *Presented by the Publisher.*

ASIA.

Caspian Sea—Cartography. **Bagroff.**

L. S. Bagroff. Materials for an historical sketch of the maps of the Caspian Sea. St. Petersburg, 1912. Size 10½ × 7, pp. 112. *Facsimile-maps and Illustrations.* [In Russian.]

Central Asia. *La G., B.S.G. Paris* **26** (1912): 376–398. **Allemand-Martin.**

Le dernier voyage de Joseph Martin à travers la Chine et l'Asie centrale (1889–1892). Par Dr. Allemand-Martin. *Portrait.*

Central Asia. **Mushketof.**

Zap. Imp. Russ. G.S., General G. **39** (1912): Part 2: pp. 100.

Collected works of Ivan Vassilef Mushketof. Part 2: Travels in the Alai and Pamir, 1877. *Sketch-maps and Sections.* [In Russian.]

Central Asia. **Obrucheff.**

V. A. Obrucheff. On the orography and geology of the Kalbinsk ranges. Tomsk, 1912. Size 9 × 6, pp. 20. *Sketch-map.* [In Russian.]

Central Asia—Altai. **Alexeieff.**

Zap. Milit.-Topogr. Sect. General Staff **66**, Sect. 2 (1911): 61–81.

Astronomical points fixed in the Altai mountains in 1909. By Colonel — Alexeieff. *Map, Plans, and Illustrations.* [In Russian.]

The same publication contains various other reports on determinations of position in Siberia.

Central Asia—Altai. *Iz. Imp. Russ. Geogr. Soc.* **48** (1912): 257–360. **Rieznichenko.**

On ancient and contemporary glaciers of the South-Western Altai mountains. By V. Rieznichenko. *Illustrations.* [In Russian.]

Central Asia—Tian Shan. **Machachek.**

Petermanns M., Ergänzungsheft No. **176** (1912): pp. vi. and 142.

Der Westlichste Tienschan. Ergebnisse einer geographischen Studienreise. Von Dr. Fritz Machatschek. *Map, Sections, and Illustrations.*

China—Missions. **Macgowan.**

How England saved China. By J. Macgowan. London: T. Fisher Unwin, [1913]. Size 9 × 5½, pp. 320. *Illustrations.* *Price* 10*s.* 6*d. net.* *Presented by the Publisher.*

China—Shensi. **Keyte.**

The Passing of the Dragon. The story of the Shensi revolution and relief expedition. By J. C. Keyte. London: Hodder & Stoughton, [1913]. Size 8 × 5½, pp. xii. and 311. *Sketch-map, Portrait, and Illustrations.* *Price* 6*s.* *Presented by the Publishers.*

China—Western. *La G., B.G.S. Paris* **26** (1912): 365–375. **Legendre.**

Exploration dans la Chine occidentale et les marches tibétaines. Par A. F. Legendre. *Sketch-map.*

See note in the Monthly Record, April, p. 384.

China—Western. *B.S.G. Lille* **58** (1912): 334–357. **Legendre.**

Exploration dans la Chine Occidentale et dans les marches thibétaines. Par Dr. A. Legendre. *Map.*

China and Mongolia. **Kendall.**

A wayfarer in China: impressions of a trip across West China and Mongolia. By Elizabeth Kendall. London: Constable & Co., 1913. Size 8½ × 5½, pp. xvi. and 338. *Sketch-map and Illustration. Price* 10*s.* 6*d. net. Presented by the Publishers.*

Chinese Empire. **Filchner.**

Wissenschaftliche Ergebnisse der Expedition Filchner nach China und Tibet, 1903–1905. 4–5 Bde.; Ergänzungsband zum Kartenwerk Nordost-Tibet. Herausgegeben von Dr. Wilhelm Filchner (Text, und Bilder und Karten). Berlin: E. S. Mittler und Sohn, 1913. Size 10 × 7, pp. (vol. 4) viii. and 148; (vol. 5) vi. and 113 pls. *Maps and Illustrations. Presented by the Publishers.*

Chinese Empire—Manchuria. *Iz. Imp. Russ. G.S.* **47** (1911): 339–45. **Vialukh.**

The volcanic district Uyun Kholdon in Northern Manchuria, 1000 versts from the sea, as it appeared between 1720–1722. By J. K. Vialukh. [In Russian.] *Plan and Illustrations.*

Chinese Empire—Mongolia. *Iz. Imp. Russ. G.S.* **47** (1911): 491–494. **Vladimirtzoff.**

Explanation of a map of North-Western Mongolia, constructed by Mongols. By B. Vladimirtzoff. [In Russian.] *Map.*

Chinese Empire—Travel. **Wallace.**

The Big Game of Central and Western China. Being an account of a journey from Shanghai to London overland across the Gobi desert. By Harold Frank Wallace. London: John Murray, 1913. Size 9 × 6, pp. xviii. and 318. *Sketch-map and Illustrations. Price* 15*s. net. Presented by the Publisher.*

Eastern Asia—Agriculture. **King.**

Farmers of Forty Centuries; or, Permanent Agriculture in China, Korea, and Japan. By F. H. King. Madison, Wis.: Mrs. F. H. King, 1911. Size 8 × 5½, pp. x. and 441. *Illustrations. Price* $2.50 *post paid. Presented by the Publisher.*

Eastern Asia—Historical. **Douglas and Longford.**

Europe and the Far East, 1506–1912. By Sir Robert K. Douglas. Revised and corrected, with an additional chapter (1904–1912) by Joseph H. Longford. (Cambridge Historical Series, edited by G. W. Prothero.) Cambridge: University Press, 1913. Size 7½ × 5, pp. viii. and 487. *Maps. Price* 7*s.* 6*d. net. Presented by the Publishers.*

India. **Elwin.**

India and the Indians. By Edward F. Elwin. London: John Murray, 1913. Size 9 × 6, pp. xii. and 352. *Illustrations. Price* 10*s.* 6*d. net. Presented by the Publisher.*

Turkey—Palestine. **Baldensperger.**

The immovable East: studies of the people and customs of Palestine. By Philip J. Baldensperger. Edited with a biographical introduction by Frederic Lees. London: Pitman & Sons, 1913. Size 9 × 5½, pp. xix. and 310. *Sketch-map and Illustrations. Price* 7*s.* 6*d. net. Presented by the Publishers.*

Turkey—Palestine. **Elmendorf.**

A camera crusade through the Holy Land. By Dwight L. Elmendorf. London: J. Murray, 1913. Size 10 × 7, pp. xiv. and 56. *Map and Illustrations. Price* 10*s.* 6*d. net. Presented by the Publisher.*

Western Asia. **Grothe.**

Hugo Grothe. Meine Vorderasienexpedition 1906 und 1907. Band 2. Leipzig: Karl W. Hiersemann, 1912. Size 10 × 7½, pp. xiv. and 318. *Sketch-maps and Illustrations. Price M.*32. *Presented by the Publisher.*

Vol. 1 was reviewed in vol. 39, p. 61.

AFRICA.

Abyssinia. **Chiovenda.**

Minist. delle Col. (Italia); Monografie e Rapp. col., No. 24 (1912): pp. 132.

Etiopia: osservazioni botaniche, agrarie ed industriali fatte nell' Abissinia Settentrionale nell' anno 1909. Del prof. Emilio Chiovenda.

Africa—Colonization. **Johnston.**

A History of the Colonization of Africa by Alien races. By Sir Harry H. Johnston. New edition, revised throughout and considerably enlarged. (Cambridge Historical Series, edited by G. W. Prothero.) Cambridge: University Press, 1913. Size 7½ × 5, pp. xvi. and 505. *Maps. Price 8s. net. Presented by the Publishers.*

Students of African development will welcome the appearance of this carefully revised and extended edition of a standard book.

Africa—Languages. *J. African S.* **12** (1913): 120–135. **Werner.**

The languages of Africa. By A. Werner. *Map.*

Africa—Railways. *L'Afrique Française* **23** (1913): 5–12. **Nieger.**

La mission d'études du chemin de fer transafricain. Par Capitaine Nieger. *Sketch-maps and Portrait.*

See note in the April number, p. 386.

Belgian Congo—Lukuga. *Mouvement G.* **29** (1912): 541–545. **Schwetz.**

Exploration de la rivière Lukuga, émissaire du Tanganika. Par Dr. J. Schwetz. *Sketch-map.*

British East Africa. **Wilson.**

A British Borderland: Service and Sport in Equatoria. By Captain H. A. Wilson. With an introduction by J. Cathcart Wason. London: John Murray, 1913. Size 9 × 6, pp. xxii. and 347. *Map and Illustrations. Price 12s. net. Presented by the Publisher.*

On the wrapper the sub-title appears as 'Experiences of Service, Sport, and Settlement in British Equatoria.'

Cape Colony—Historical. *South African J. Sc.* **9** (1912): 103–107. **Schwarz.**

Bartholomieu Dias's furthest East. By Prof. Ernest H. L. Schwarz. *Also separate copy, presented.*

See note in the Monthly Record, *ante.*

Central Africa. **McQueen.**

Prospecting from the Victoria Nyanza to Lake Mweru. (Extract from Mr. McQueen's letter of the 9th June, 1911.) [Typewritten sheets.]

Congo—Hydrology. *C.R.A. Sc. Paris* **155** (1912): 1141–1144. **Roussilhe.**

Le régime des crues dans le réseau fluvial congolais. Par M. Roussilhe.

Egypt—Cairo. *J.R. Asiatic S.* (1913): 23–40. **Richmond.**

The significance of Cairo. By Ernest Richmond.

Egypt—Libyan Desert. *B. American G.S.* **44** (1912): 721–745. **Sykes.**

A journey in the Libyan Desert. By Godfrey Sykes. *Sketch-maps and Illustr.*

Mr. Sykes accompanied Prof. McDougall (*Journal*, vol. **40**, p. 86).

Egypt—Sinai peninsula. *Cairo Sc. J.* **6** (1912): 264–273. **Murray.**

The Hamada country. By G. W. Murray. *Map and Illustrations.*

A small area in the south-west of the peninsula.

Egyptian Sudan. **Weinthal.**

The story of the Royal visit to the Sudan, 1912. Compiled and illustrated by Leo Weinthal. London, 1912. Size 14½ × 9½, pp. 56. *Sketch-map and Illustrations. Presented by the Author.*

Egyptian Sudan—Cotton. ——.

The British Cotton Growing Association, No. 46. December, 1912. Report to the Council on the possibilities of cotton-growing in the Anglo-Egyptian Sudan. Manchester, 1912. Size 8½ × 5½, pp. 30.

Egyptian Sudan—Trade. ——

Egypt. Report for the year 1911 on the trade viâ Port Sudan. (Diplomatic and Consular Reports, Annual Series, No. 5026, 1912.) London, 1912. Size 9½ × 6, pp. 6.

French West Africa—Boundary. *L'Afrique Française* **22** (1912): 412–416. ——

La délimitation du Dahomey et du Togo. *Sketch-maps.*

See note in vol. **40**, p. 644.

Nigeria—Ethnology. **Thomas.**

Anthropological report on the Ibo-speaking peoples of Nigeria. By Northcote W.

Thomas. 3 vols. London: Harrison & Sons, 1913. Size 9 × 5½, pp. (vol. 1) 162; (vol. 2) viii. and 392; (vol. 3) vi. and 300. *Sketch-map and Illustrations. Presented by the Government of Southern Nigeria.*

Portuguese East Africa. **Lyne.**

Mozambique: its agricultural development. By Robert Nunez Lyne. London: T. Fisher Unwin, [1913]. Size 9 × 6, pp. 352. *Map and Illustrations. Price* 12*s.* 6*d. net. Presented by the Publisher.*

South Africa. **Scully.**

Reminiscences of a South African Pioneer. (1st Series, "Wanderjahre.") By William Charles Scully. London: T. Fisher Unwin, 1913. Size 9 × 6, pp. 320. *Portrait and Illustrations. Presented by the Publisher. Price* 10*s.* 6*d. net.*

South Africa—Earth-movements. *Geol. Mag.*, Dec. V., **9** (1912): 540–550. **Schwarz.**

Post-Jurassic earth-movements in South Africa. By Prof. E. H. L. Schwarz. *Sketch-map and Section.*

South Africa—Zimbabwe—Archæology. **Masey.**

P. Rhodesia Sc. Assoc. **11** (1911): 37–56.

Zimbabwe: An architect's notes. By Francis Edward Masey. *Plan, Sections, and Illustrations.*

Tripoli. **Schweinfurth.**

Ministero degli Affari Esteri: Monografie e rapporti coloniali, No. 15. Lettera sulla Libia del Dr. G. Schweinfurth al Prof. A. Borzi. Rome, 1912. Size 9½ × 6½, pp. 8.

On the agricultural possibilities of Tripoli.

Tripoli—Archæology. **Baschmakoff.**

Alexandre Baschmakoff. La Tripolitaine et la Cyrenaïque; étude historique et ethnographique. Paris: H. le Soudier, [1913]. Size 9½ × 6½, pp. 96. *Illustrations. Price* 2 *fr. Presented by the Publisher.*

Tunis. *B.S.G. Comm. Paris* **33** (1912): 193–204. **Barrion.**

Le Canal du Djerid. Par Georges Barrion.

Urges the need of a precise survey of the Shotts, in connection with the old project of a canal, either for drainage purposes or for navigation.

Tunis—Agriculture. **Decker-David.**

P. Decker-David. L'Agriculture indigène en Tunisie. (2e édition.) Tunis: Saliba et fils (Auch: Bouquet & Cie.), 1912. Size 10 × 6½, pp. x. and 777. *Sketch-map, Portrait, and Illustrations.*

West Africa. **Field.**

"Verb. Sap." on going to West Africa, Northern, Southern, Nigeria, and to the Coasts. By Captain Alan Field. (3rd edit.) London: Bale, Sons & Danielsson, 1913. Size 7½ × 5, pp. 252. *Map and Illustrations. Price* 2*s.* 6*d. Presented by the Publishers.*

See notice of the first edition in vol. **25**, p. 204.

West Africa—Historical. *La G., B.S.G. Paris* **26** (1912): 319–328. **Avelot.**

Une exploration oubliée: voyage de Jan de Herder au Kwango (1642). Par R. Avelot. *Sketch-maps and Illustrations.*

Though not perhaps known to the general public, this journey can hardly be said to be forgotten by students of the history of African exploration.

West Africa—Languages. **Migeod.**

The languages of West Africa. Vol. 2. By Frederick Hugh Migeod. London: K. Paul & Co., 1913. Size 9 × 5, pp. x. and 436. *Price* 12*s.* 6*d. net. Presented by the Publishers.*

NORTH AMERICA.

Alaska. *Iz. Imp. Russ. G.S.* **48** (1912): 295–341. **Kirilloff.**

Alaska and its relation with the Chukche peninsula. By N. V. Kirilloff. [In Russian.]

Alaska—Glaciation. *J. Geology* **20** (1912): 415–437. **Capps.**

Glaciation of the Alaska Range. By Stephen R. Capps. *Sketch-map and Illustrations.*

Alaska—Mount Katmai. *B. Seismological S. America* **2** (1912): 226–229. **Clark.**

The Katmai eruption. By George Archibald Clark. *Illustrations.*

See note in the Monthly Record, April, p. 387.

America—Anthropogeography. **Clark.**

The distribution of animals and its bearing on the peopling of America. By Austin Hobart Clark. (Reprinted from the *American Anthropologist*, vol. 14, No. 1, January–March, 1912.) [New York, 1912.] Size 10 × 6½, pp. 23–30.

America—Anthropogeography. **Nordenskiöld.**

Ymer: Ts. Svenska S. Anthropologi och G. **32** (1912): 181–187.

Ett bidrag till kännedom om Amerikas antropogeografi. Af Erland Nordenskiöld.

America—Congress. ———

Actas del XVII° Congreso Internacional de Americanistas; Sesión de Buenos Aires, 17–23 de Mayo de 1910. Publicadas por Robert Lehmann-Nitsche. Buenos Aires, 1912. Size 10½ × 6½, pp. 676, 58, and 48. *Illustrations.*

America—Discovery. **Neckel.**

Voigtländers Quellenbücher. Band **43**. Die erste Entdeckung Amerikas im Jahre 1000 n. Chr. Von Dr. Gustav Neckel. Leipzig: R. Voigtländer, [1913]. Size 7 × 5, pp. 92. *Sketch-map and Illustrations. Price* 80 *Pf. Presented by the Publisher.*

Canada—Alberta—Yellowhead pass. *Alpine J.* **26** (1912): 382–407. **Wheeler.**

The mountains of the Yellowhead Pass. By A. O. Wheeler. *Map and Illustrations.*

Canada—Economic. **Fleck.**

Probleme der Weltwirtschaft. Schriften des Instituts für Seeverkehr und Weltwirtschaft an der Universität Kiel, herausgegeben von Prof. Dr. Bernhard Harms. 10.—Kanada. Volkswirtschaftliche Grundlagen und Weltwirtschaftliche Beziehungen. Von Dr. Anton A. Fleck. Jena: Gustav Fischer, 1912. Size 11 × 8, pp. xiv. and 367. *Map. Price* 13*s.*

Canada—Ontario—Abitibi. *B S.G. Québec* **6** (1912): 385–393. **Piche.**

Notes sur l'Abitibi. Par G. C. Piche. *Illustrations.*

Canada—Railways. *United Empire* **3** (1912): 960–969. **Mallett.**

Railway development in Canada. By Justinian Mallett. *Sketch-map.*

Mexico—Yucatan. *B. American G.S.* **44** (1912): 801–822. **Huntington.**

The peninsula of Yucatan. By Ellsworth Huntington. *Sketch-map and Illustrations.*

North America. **Dryer.**

The North America of to-day and to-morrow and Indiana's place in it. By Charles Redway Dryer. President's address. (Reprinted from *Proceedings* of the Indiana Academy of Science, 1911.) [Indianapolis, 1911.] Size 9 × 6, pp. 37–54. *Maps.*

North America—Zoogeography. **Trotter.**

The faunal divisions of Eastern North America in relation to vegetation. By Dr. Spencer Trotter. (From the *Journal* of the Academy of Natural Sciences of Philadelphia, vol. 15, Second Series, March 21, 1912.) Philadelphia, 1912. Size 14½ × 11, pp. 207–218. *Presented by the Author.*

United States—California. **Johnson.**

California. An Englishman's impressions of the Golden State. By Arthur T. Johnson, with illustrations by E. Nora Meek. London: Stanley Paul & Co., 1913. Size 9 × 6, pp. 346. *Illustrations. Price* 10*s.* 6*d. net.*

United States—Cotton. **Copeland.**

The Cotton Manufacturing Industry of the United States. By Melvin Thomas Copeland. (Harvard Economic Studies, vol. 8.) Cambridge [Mass.]: Harvard University [London: Henry Frowde], 1912. *Price* $2 *net. Presented by the Publishers.*

CENTRAL AND SOUTH AMERICA.

Argentine—Phytogeography. *Ann. S. Cient. Argentina* **74** (1912): 185–225. **Seckt.**

Contribución al conocimiento de la vegetación del noroeste de la República Argentina (Valles de Calchaqui y Puna de Atacama). Por el doctor Hans Seckt.

Bolivia and Peru. **Debenedetti.**

Actas XVII. Congreso Americanistas, 1910 (1912): 627–676.

Salvador Debenedetti. Excursión del XVII° Congreso Internacional de Americanistas á Bolivia y Perú.

Brazil—Pará. *B. Pan American Union* **35** (1912): 682–698. **Hale.**

The Port of Pará. By Albert Hale. *Maps, Plans, and Illustrations.*

Panama Canal. **Isthmian Canal Commission.**

Annual Report of the Isthmian Canal Commission for the fiscal year ending June 30, 1912. Washington, 1912. Size 9½ × 6, pp. xxii. and 618. *Illustrations and Section; Maps and Diagrams in separate case.*

See Dr. Cornish's article in the March number.

Panama Canal. **Isthmian Canal Commission.**

Official handbook of the Panama Canal. 3rd edit., revised and enlarged. Compiled by the Secretary of the Isthmian Canal Commission. Ancon, 1913. Size 9 × 5, pp. 54. *Maps, Diagrams, and Illustrations.*

Peru—Communications. *An. Direccion Fomento, Peru*, 1912, No. 1, 43–88. **Tamayo.**

La comunicación radiográfica directa entre Lima é Iquitos. Por Augusto E. Tamayo.

Peru—Cuzco—Archæology. *American J. Sc.* **34** (1912): 497–509. **Bowman.**

A buried wall at Cuzco and its relation to the question of a pre-Inca race (Yale Peruvian Expedition, 1911). By Isaiah Bowman. *Plan, Sections, and Illustrations.*

Peru—Ethnology. *Actas XVII. Congreso Americanistas*, 1910 (1912): 302–353. **Uhle.**

Max Uhle. Los orígenes de los Incas. *Illustrations.*

Peru—Incas. **Bingham.**

A search for the last Inca Capital. By Hiram Bingham. (Reprinted from *Harper's Magazine*, October, 1912.) Size 9½ × 6½, pp. 695–705. *Illustrations. Presented by the Author.*

Peru—Surveys. *An. Direccion Fomento Peru*, 1912: No. 1, 89–94. ——

Calculo geodésico de la distancia entre Callao y Puerto Bermúdez, y entré Callao é Iquitos.

South America. **Page.**

The Land of the Peaks and the Pampas. South America of Yesterday and To-day. By Jesse Page. London: The Religious Tract Society, 1913. Size 8 × 5½, pp. xvi. and 368. *Map and Illustrations. Price 3s. 6d. net. Presented by the Publishers.*

Described in the preface as "an honest attempt . . . to rehabilitate with life the dry bones of a past in South America . . . to show by what pathways her people have reached their present conditions, and with what hopes and fears, sunbeams and shadows, the horizon of the future may be scanned to-day." The book puts forward the claims of South America as a field for missionary enterprise.

POLAR REGIONS.

Antarctic—French Expedition. **Charcot.**

Deuxième Expédition Antarctique Française (1908–1910), commandée par le Dr. Jean Charcot. Sciences physiques; documents scientifiques. Ouvrage publié . . . sous la direction de L. Joubin. Observations météorologiques, par J. Rouch (pp. 260); Etude sur les marées, par R. E. Godfroy (pp. 74), Cartes; (10 sheets). Paris: Masson et Cie., 1911–1912. Size 11 × 9. *Maps, Diagrams, and Illustrations. Presented by the Ministère de l'Instruction Publique, France.*

Greenland—Archæology. *Meddelelser om Grønland* **50** (1912): 97–104. **Jespersen.**

Nyopdagede Nordbo-Ruiner: Julianehaab-Distrikt. Af Erik Jespersen. *Plans.*

Cf. *Journal*, vol. **39**, p. 496.

Greenland—Ethnography. **Steensby.**

Meddelelser om Grønland **50** (1982): 133–173.

Etnografiske og antropogeografiske Rejsestudier i Nord-Grønland, 1909. Af H. P. Steensby. *Illustrations.*

Greenland—Phytogeography. *Meddelelser om Grønland* **50** (1912): 349–389. **Porsild.**

The vascular plants of West Greenland between 71° and 73° N. lat. By Morten P. Porsild. *Sketch-map and Illustrations.*

Novaya Zemlya—Minerals.

District of Copper and Cupriferous ores in the Island of Novaya Zemlia, in the region of the Propashtshaya Gouba. Odessa, 1913. Size 8½ × 6, pp. 34. *Sketch-map and Diagram.*

Spitsbergen—Coal. **Geer.**

Ymer: Ts. Svenska S. Antropologi och G. **32** (1912): 335–380.

The coal region of Central Spitzbergen. By Gerard de Geer. *Maps and Illustrations.*

See Monthly Record, *ante*.

Spitsbergen—Historical. **Shidlovsky.**

Zap. on Hydrography **34** (1912): Appendix, pp. 64.

Spitsbergen in Russian history and literature. Short historical account of Russian voyages to Spitsbergen and commercial undertakings therein, and detailed index of the literature and archives relating to those questions. By A. F. Shidlovsky. *Also separate copy, presented.* (St. Petersburg, 1912. Size 10½ × 7, pp. iv. and 64.) [In Russian.]

Spitsbergen—Hydrography. **Isachsen.**

The hydrographic observations of the Isachsen Spitsbergen Expedition, 1909–1910. By Gunnar Isachsen. (From *Videnskapsselskapets Skrifter*, I. Mat.-Naturw. Klasse, 1912. No. 14.) Christiana, 1912. Size 10½ × 7, pp. 36. *Maps and Illustrations.*

MATHEMATICAL GEOGRAPHY.

Cartography—International map. *R. Engineers J.* **17** (1913): 77–86. **Hinks.**

The international one-in-a-million map of the world. By Arthur R. Hinks.

Geodesy. **Buchwaldt.**

Kaptajn F. A. Buchwaldt. Sfæroidens regnelinje. Copenhagen, 1911. Size 11½ × 9, pp. 74. *Diagrams.*

Gravity determination. **Bowie.**

Some results of the Hayford method of gravity reduction. By William Bowie. (Reprinted from the *Journal of the Washington Academy of Sciences*, vol. 2. No. 21, 1912.) Washington, 1912. Size 10 × 7, pp. 499–504. *Presented by the Author.*

Photographic Surveying. **Callot.**

Ann. Hydrographiques (2 Sér.) **30** (1908-1910): 79–121.

Emploi des appareils panoramiques dans les levés photographiques. Par M. Callot. *Diagrams and Illustrations.*

PHYSICAL AND BIOLOGICAL GEOGRAPHY.

Æolian deposits. *Ann. I. Océanogr. Monaco* **3** (1911) Fasc. 2: 1–8. **Thoulet.**

Analyse d'une poussière éolienne de Monaco et considérations générales relatives à l'influence de la déflation sur la constitution lithologique du sol océanique. Par J. Thoulet.

Atlantis. *B. I. Océanogr. Monaco*, No. 256 (1913): pp. 22. **Termier.**

L'Atlantide. Par Pierre Termier.

See April number, p. 391.

Coral formations. *Ann. I. Océanogr. Paris* **4** (1912), Fasc. 2: pp. 8. **Joubin.**

Carte de bancs et récifs de coraux (Madrépores). Par L. Joubin. *Maps.*

See note in the May number, p. 494.

Coral-formations. *Ann. I. Océanogr. Paris* **2** (1911), Fasc. 3: pp. 100. **Gravier.**

Les récifs de coraux et les madréporaires dans la baie de Tadjourah (Golfe d'Aden). Par Ch. Gravier. *Maps and Illustrations.*

Erosion. *G. Anzeiger* **13** (1912): 225–226. **Solger.**

Die Schützende Rolle des Meer- und Flusswassers bei der Abtragung. Von Prof. Dr. F. Solger. *Illustrations.*

Illustrated by examples from China.

Geomorphology—Ripple-mark. **Epry.**

Ann. I. Océanogr. Paris **4** (1912), Part 3: pp. 16.

Les Ripple-marks. Par Ch. Epry. *Illustrations and Diagrams.*

Geomorphology—Valleys. *G.Z.* **18** (1912): 665–682. **Hettner.**
Alter und Form der Täler. Von Alfred Hettner.

Rivers and Estuaries. **Hunter.**
Rivers and Estuaries, or Streams and Tides. An elementary study. By W. Henry Hunter. London: Longmans, Green & Co., 1913. Size 9½ × 6, pp. 66. *Sketch-maps and Sections. Price* 2*s.* 6*d.*

Terrestrial Magnetism. **Bauer.**
Researches of the Department of Terrestrial Magnetism. Land Magnetic Observations, 1905-1910. By L. A. Bauer. Washington, D. C.: Carnegie Institution of Washington, 1912. Size 12 × 9, pp. iv. and 185. *Illustrations. Presented by the Author.*

Volcanoes. **Bonney.**
Volcanoes: their structure and significance. By Dr. T. G. Bonney. 3rd edit. London: J. Murray, 1913. Size 8½ × 5½, pp. 380. *Sketch-maps and Illustrations. Price* 6*s. net. Presented by the Publisher.*

ANTHROPOGEOGRAPHY AND HISTORICAL GEOGRAPHY.

Colonisation—Tropics. *J. Scottish Met. S.* **16** (1912): 3–9. **Gregory.**
The wet-bulb thermometer and tropical colonisation. By Prof. J. W. Gregory.

Commercial—Navigation—Bibliography. **Pradelle.**
Permanent International Association of Navigation Congresses. Rivers, Canals, and Ports. Bibliographic notes giving the list of the principal works which have appeared, and of the articles published in periodicals of all countries, from January 1, 1907, to December 31, 1910. Compiled by Jean Pradelle. Brussels, 1912. Size 9 × 6½, pp. xxxii. and 710.

Historical. **Hall.**
The ancient history of the Near East, from the earliest times to the battle of Salamis. By H. R. Hall. London: Methuen & Co., 1913. Size 9 × 6, pp. xxiv. and 602. *Sketch-maps and Illustrations. Price* 15*s. net.*

Historical—Flinders. ———
P.R.G.S. Australasia, South Australian Br. **12** (1910–11): 36–41.
General De Caen's report on the detention of Flinders.

Historical—Travel. **Meyer**
Ymer: Ts. Svenska S. Antropologi och G. **32** (1912): 139–143.
En obeaktad svensk reseskildrare på 1600-talet. Af Ernst Meyer.
On a MS. in the Upsala University Library, narrating the travels of Anders Toreson.

Physiological—Altitude-effects. **Douglas and others.**
Physiological observations made on Pike's Peak, Colorado, with special reference to adaptation to low barometric pressures. By C. G. Douglas, Dr. J. S. Haldane, Dr. Y. Henderson, and Dr. E. C. Schneider (pp. 185–318). The changes in the breathing and the blood at various high altitudes. By Mabel Purefoy Fitzgerald (pp. 351–371). (*Philosophical Transactions of the Royal Society of London*, Series B, vol. **203**, Nos. 299 and 301.) London, 1913. *Illustrations and Diagrams. Presented by Dr. J. S. Haldane.*

BIOGRAPHY.

Davis. *B.G.S. Philadelphia* **10** (1912): 224–234. **Huntington.**
William Morris Davis, Geographer. By Ellsworth Huntington. *Portrait.*

GENERAL.

Asia and Africa—Sport. **Stockley.**
Big Game Shooting in India, Burma, and Somaliland. By Colonel V. M. Stockley. London: Horace Cox, 1913. Size 10 × 6½, pp. xii. and 282. *Diagrams and Illustrations. Price* 21*s. net. Presented by the Publisher.*

Education—Text-book. **Morrow and Lambert.**
A practical and experimental geography. By Frederick Morrow and Ernest Lambert. London: Meiklejohn & Son, 1913. Size 7½ × 5, pp. xiv. and 240. *Sketch-maps and Diagrams. Price* 2*s.* 6*d. net. Presented by the Publishers.*

NEW MAPS.

By E. A. REEVES, *Map Curator*, R.G.S.

EUROPE.

Austria-Hungary. **K. u. K. Militärgeographisches Institut.**

Spezialkarte der österreichisch-ungarischen Monarchie und anschliessender Gebiete. Scale 1 : 75,000 or 1 inch to 1·2 stat. miles. Sheet: Zone 9, Kol. XXII. Hohe Tatra; Zone 19, Kol. IX. Tarvis. Vienna: K. u. K. Militärgeographisches Institut, 1912.

Balkan Peninsula. **Derok.**

General Map of Old Servia and Macedonia. By D. J. Derok. Scale 1 : 250,000 or 1 inch to 3·9 stat. miles. Sheet: Kostendil-Jumaya. Belgrade, 1913.

This map was commenced in 1904, and will, when complete, consist of twelve sheets, only five of which have so far been published. Relief is shown by contours at 100-metre intervals. The fifth sheet, which has recently appeared, is somewhat different in style of production from the others, and, in addition to the contours, colour tinting in shades of brown is employed with decided advantage to accentuate the relief. In parts the map is somewhat overcrowded.

British Isles—England and Wales. **Ordnance Survey.**

Sheets published by the Director-General of the Ordnance Survey, from April 1 to 30, 1913.

6-inch maps:—

Revised quarter-sheets, with contours in blue. *Price* 1*s. each.*

Berkshire, 3 sheets. **Cheshire**, 1 sheet. **Lancashire**, 1 sheet. **Yorkshire**, 1 sheet.

1 : 2500 scale maps:—

Revised, with houses stippled, and with areas. *Price* 3*s. each.*

Carnarvonshire, 3 sheets. **Denbighshire**, 11 sheets. **Flintshire**, 1 sheet. **Lancashire**, 51 sheets. **Middlesex**, 8 sheets. **Oxfordshire**, 2 sheets. **Surrey**, 4 sheets. **Westmorland**, 3 sheets. **Yorkshire**, 20 sheets.

(*E. Stanford, Ltd., London Agents.*)

Central Europe. **K. u. K. Militärgeographisches Institut, Vienna.**

Generalkarte von Mitteleuropa. Scale 1 : 200,000 or 1 inch to 3·2 stat. miles. Sheets: 26°–46°, Varese; 30°–43°, Perugia; 38°–39°, Preveza; 42°–44°, Slatina. Vienna: K. u. K. Militärgeographisches Institut, 1912. *Price* 1.20 *M. each sheet.*

France. **Barrère.**

Carte Touriste de France. Dressée avec le concours du Touring-Club de France. Scale 1 : 400,000 or 1 inch to 6·3 stat. miles. Sheets: XIII., Bayonne; XIV., Toulouse. Paris: Henry Barrère, 1913.

Portugal. **Direcção Geral dos Trabalhos Geodesicos e Topographicos.**

Carta de Portugal. Scale 1 : 50,000 or 1·3 inch to 1 stat. mile. Sheets: 14c, Leiria; 16c, Torres Novas. Lisbon: Direcção Geral dos Trabalhos Geodesicos e Topographicos, 1901.

Russia. **Topographical Department, General Staff, St. Petersburg.**

Map of European Russia. [In Russian.] Scale 1 : 420,000, or 1 inch to 6·6 stat. miles. Sheet 114, Astrakhan. St. Petersburg. Topographical Dept., General Staff, 1905.

Switzerland **Schweizerische Landestopographie, Bern.**

Eisenbahnkarte der Schweiz. Scale 1 : 250,000 or 1 inch to 3·9 stat. miles. 4 sheets. Bern: Schweizerische Landestopographie, 1913.

ASIA.

Asia Minor. **Kiepert.**

Karte von Kleinasien bearbeitet von Dr. Richard Kiepert. Zweite berichtigte Ausgabe. Scale 1 : 400,000 or 1 inch to 6·3 stat. miles. Sheets: A V., Unije; C. V., Malatja. Berlin: Dietrich Reimer (Ernst Vohsen), 1913.

A comparison of these sheets with the first editions will show considerable alteration and revision in certain areas, while as usual the low-lying lands have been tinted green.

China—Yunnan. **Service Géologique de l'Indo-Chine Française.**

Carte geologique du Yunnan Oriental. Scale 1:200,000 or 1 inch to 3·2 stat. miles. 6 sheets. [Hanoi]: Service Géologique de l'Indo-Chine Française, [1913].

This map is based upon the geological and palæontological explorations and surveys of Dr. J. Deprat and M. H. Mansuy, of the Geological Service of Indo-China, 1909–10, while the topographical features have been drawn by M. N. Margherti, of the same department, from itineraries of M. M. Saramon and other members of the mission of which he was the topographer. The map is in six sheets, and shows the geological features by the usual colour tinting. Although much that is given on the map can only be approximate, owing to the want of complete surveys, it is evident that a great deal of valuable work has been done.

Java. **Topographical Bureau, Batavia.**

Overzichtskaart van Java en Madoera. Scale 1:500,000 or 1 inch to 7·9 stat. miles. 4 sheets. Batavia: Topographical Bureau, 1912.

The Survey Department of Batavia has already produced many excellent cartographical specimens, and this map of Java and Modoera is quite up to the standard of the previous publications. Relief is well shown by colour tinting, and full information is given concerning boundaries, railways, roads, relative importance of towns and villages, harbours, etc. There are special inset maps on smaller scales showing (1) telegraph and telephone lines and stations; (2) rainfall; (3) general geological features; and (4) national products. The map is in four sheets, each of which measures 30 by 21½ inches.

Sumatra. **Topographical Bureau, Batavia.**

Schetskaart van het noordelijk gedeelte der Residentie Oostkust van Sumatra. Scale 1:200,000 or 1 inch to 3·2 stat. miles. 4 sheets. Batavia: Topographical Bureau, 1912.

A clearly executed map compiled from the latest surveys, and printed in colours. Much of the area included is still very imperfectly surveyed and mapped, especially those of the higher lands in the interior.

AFRICA.

Africa. **Geographical Section, General Staff.**

Africa. Scale 1: 250,000 or 1 inch to 3·9 stat. miles. Sheets: South A 37–C, Mumoni, East Africa Protectorate; South A 37–T, Meru, East Africa Protectorate; South H 34–B, Schuit Drift, Cape of Good Hope; South H 34–J, Kenhardt, Cape of Good Hope; South H 34–P, Van Wyk's Vlei, Cape of Good Hope; South H 34–V, Fraserburg, Cape of Good Hope. Published by the Geographical Section, General Staff, War Office, 1912–13. London agents: E. Stanford, Ltd.; Sifton, Praed & Co.; T. Fisher Unwin. *Price* 1*s.* 6*d. net each sheet. Presented by the Director of Military Operations.*

Egypt. **Baraize.**

Service des Antiquités de l'Égypte. Plan des Nécropoles Thébaines levé par M. É. Baraize, Directeur de Travaux au Service des Antiquités. Quatrième Livraison (Feuilles 40, 43, 51, et 54). Cairo: General Survey Printing Office, 1913. *Price* 25 *P.E.*

German East Africa. **Kais Gouvernement von Deutsch-Ostafrika.**

Usambara- und Kustengebiet in den Bezirken Tanga, Pangani und Wilhelmstal. In 4 Blattern. Herausgegeben vom Kaiserlichen Gouvernement von Deutsch-Ostafrika. Scale 1: 100,000 or 1 inch to 1·6 stat. mile. Sheets B, C, D. Berlin: Dietrich Reimer (Ernst Vohsen), [1913]. *Price* 6*M. each sheet.*

This map is now complete. Sheet A was noticed in the *Geographical Journal* for July, 1911. It is an important map, and a special feature is the careful manner in which the vegetation has been shown; the different kinds of forests, bush, grassland, plantations of Europeans, etc., being clearly distinguished by different symbols. Relief is indicated by shading and contour-lines at 25-metre intervals.

Southern Nigeria. **Southern Nigeria Survey.**

Plan of Town of Lagos. Compiled by Cadastral Branch, Southern Nigeria Survey. Scale 1: 3960 or 1 inch to 330 feet. Revised to January, 1913. London: Edward Stanford, Ltd., 1913. *Price* 7*s.* 6*d.*

A useful general plan, printed in colours, with contours, and giving considerable detailed information.

Union of South Africa. **Mines Dept., Geological Survey.**

Geological map of the Union of South Africa. Scale 1 : 150,000 or 1 inch to 2·3 stat. miles. Sheet 10: Nylstroom, with explanation. Pretoria: Mines Department, Geological Survey, 1912. *Presented by the Mines Department, Geological Survey, Pretoria.*

AMERICA AND WEST INDIES.

Canada. **Dept. of the Interior, Ottawa.**

Standard Topographic Map of Canada. Scale 1 : 500,000 or 1 inch to 7·89 stat. miles. Sheet: New Brunswick. Ottawa: Department of the Interior, Topographical Surveys Branch, 1912. *Presented by the Department of the Interior, Ottawa.*

Canada. **Dept. of Militia and Defence, Ottawa.**

Topographic map of Canada. Scale 1 : 63,360 or 1 inch to 1 stat. mile. Sheets: 32, Tillsonburg; 39, Bothwell; 40, Sarnia; 42, St. Clair Flats; 43, Ridgetown. Published by the Geographical Section, General Staff, War Office, 1913. London Agents: E. Stanford, Ltd.; Sifton, Praed & Co.; T. Fisher Unwin. *Price 2s. net each sheet. Presented by the Director of Military Operations.*

Canada, Ontario. **Dept. of Agriculture, Ontario.**

Map of the Province of Ontario. Scale 1 : 2,217,600 or 1 inch to 35 stat. miles. Toronto: Department of Agriculture, Bureau of Colonisation, 1912.

North America. **Daly.**

Geology of the Forty-Ninth Parallel. By R. A. Daly. Scale 1 : 62,500 or 1 inch to 0·98 stat. mile. 17 sheets. Ottawa: Department of Mines, Geological Survey, [1913]. *Presented by the Department of Mines, Geological Survey, Ottawa.*

Panama. **Philip.**

The *Daily Mail* Chart of the Panama Canal. London: George Philip & Son, Ltd., 1913. *Presented by the Publishers.*

A sheet containing a bird's-eye view of the Panama canal, an outline map of the world showing steamer tracks *viâ* the canal and round Cape Horn, with seven other interesting plans and diagrams showing locks, comparison with other canals as regards dimensions and approximate cost of production.

United States. **Dept. of the Interior, Washington.**

State of Arizona. Compiled from the official Records of the General Land Office and other sources under the direction of I. P. Berthrong, Chief of Drafting Division, G.L.O. Scale 1 : 760,320 or 1 inch to 12 stat. miles. Washington: Department of the Interior, General Land Office, 1912.

West Indies—Barbadoes. **Bacon.**

Island of Barbados. Scale 1 : 63,360 or 1 inch to 1 stat. mile. London: G. W. Bacon & Co., Ltd, [1913]. *Price, mounted and folded in case, 3s. Presented by the Publishers.*

A general map showing the division of the island in parishes, but without hill shading or any indication of relief. The railway and roads are shown.

West Indies—Trinidad. **Stanford.**

A map of Trinidad. Scale 1 : 150,000 or 1 inch to 2·3 stat. miles. London: Edward Stanford, [1913]. *Price 5s.*

Reduced from the map of the island on the scale of 1 : 50,000 prepared from surveys of the Trinidad Survey Department. No heights are given, and the map is more of an estate plan than map. The various reserves are shown in green, and roads and railways are clearly indicated.

GENERAL.

World. **De Agostini.**

G. De Agostini. Atlante Geografico Muto fisico politico a colori ed Albo di Esercitazioni Cartografiche in due fascicoli. Part 1, *Price* 1.50*L.* Part 2, *Price* 1*L.* Novara: Istituto Geografico De Agostini, [1913]. *Presented by the Publishers.*

A small school atlas in two parts containing altogether twenty-eight maps, without names, showing relief by colour tints and political divisions in red lines. Facing each map is a plain blank projection, similar to that upon which the map is drawn, upon which it is intended that the scholar should draw a copy of the map.

World. **De Agostini.**

Calendario-Atlante De Agostini 1913 con note geografico-statistiche del Prof. Dr. A. Machetto. Novara: Istituto Geografico De Agostini, 1913. *Presented by the Publishers.*

A small pocket atlas and calendar combined.

World. **Marconi's Wireless Telegraph Company.**

Official Wireless map of the World. Compiled by Marconi's Wireless Telegraph Company, Limited. Equatorial scale 1 : 50,000,000 or 1 inch to 789 stat. miles. London: George Philip & Son, Ltd., 1913. *Price 2s. 6d. net. Presented by the Publishers.*

This is a new edition, and shows wireless stations up to date.

World. **Meyer.**

Meyers historischer Handatlas. Mit 62 Hauptkarten, vielen Nebenkarten, einem Geschichtsabriss in tabellarischer Form und 10 Registerblättern. Leipzig and Vienna: Bibliographisches Institut, 1911.

This little historical atlas is intended as a companion to the Meyers' well-known geographical atlas, with which it is similar in size and style of execution. It contains sixty-two sheets of maps dealing with the principal historical epochs and developments from the earliest times. Each map is accompanied by letterpress, with tabular matter giving important events and dates. A great deal of historical information has been crowded into a small compass, and many of the maps suffer somewhat in consequence, as they are too full to be clearly legible.

World. **Schirmer.**

Kriegsgeschichtlicher Atlas zum Studium der Feldzüge der neuesten Zeit. 2. Auflage. Von Fritz Schirmer. Vienna: L. W. Seidel & Sohn, 1912.

The second edition of an atlas of sketch-maps and diagrams illustrative of military campaigns and battles during the last hundred and twenty years. Commencing with the Napoleonic campaigns at the end of the eighteenth century and ending with the Turko-Italian war of last year, all important military campaigns and battles are dealt with, and the disposition of troops at different dates, routes of armies, numerical strength of forces with names of leaders, are shown on a series of fifty-eight coloured plates in a bold diagrammatic style. The atlas will be interesting to students of military geography for general reference, although in many instances the information given is decidedly meagre in character.

CHARTS.

Admiralty Charts. **Hydrographic Department, Admiralty.**

Charts and Plans published by the Hydrographic Department, Admiralty, from April 6 to May 3, 1913. *Presented by the Hydrographer, Admiralty.*

New Charts—No. 2682, England, west coast: Bristol channel—Nash point to New Passage (Plan: River Usk), 3*s*. 1539, Ireland: The Shannon, sheet 6, Middle ground to Scarlet reach, 3*s*. 3415, Baltic, Gulf of Bothnia: Approaches to Refse (Räfsö) and Berneborg (Biörneborg), 3*s*. 2314, Norway: Helgö to Sörö, 3*s*. 3220, Mediterranean, France and Italy: Cape Ferrat to Bordighera (Plan: Port Monaco), 4*s*. 974, Mediterranean, Malta: Valetta harbours, 3*s*. 3335, North America, east coast: Approach to Strait of Belle Isle (Plan: Outer soundings off Belle Isle), 3*s*. 299, Newfoundland, west coast: Current island to Bird cove, 3*s*. 2666, North America: St. Johns (Newfoundland) to Halifax (Nova Scotia) with the outer banks (Plan: The Virgin rocks and Eastern shoals), 3*s*. 1427, United States, west coast: Harbours in Puget sound, Tacoma harbour (New plan of Seattle harbour on this sheet), 2*s*. 1323, South America, Peru: Independencia bay to Begueta bay (Plans: Ancon bay and adjacent islands, Chincha isles, Salinas and Chica bays), 2*s*. 3113, Africa, west coast: Achowa point to Cape Coast Castle (Plans added: Dix cove, Elmina bay, Cape Coast Castle, 3*s*. 264, Cochin China: Kin hou or Thi nai harbour, Hué river entrance (Plan added: Lakh kuen or Mahnson river, 2*s*. 776, Cochin China: Tsieng mun to Tra ko island, including the interior channels and off-lying islands (Plan added: Pakhoi anchorage), 3*s*. 3647, China, Canton river: Whampoa to Canton, sheet 2, 3*s*. 2849, China: Yang tse kiang, sheet 4: Hankau to Yo chau fu (Plan of Po yang and Kan river on this sheet erased), 3*s*. 2387, Japan, Kiu siu: Io jima to Madara jima, including Hirado shima, 3*s*. 1044, Australia, north coast: Groote Eylandt to Cape Ford, 3*s*. 3152, Australia, north-west coast: Ashburton

road, 3s. 788, South Pacific ocean between the parallels of 27° south and 60° south, and extending from Melbourne to Cape Horn, western sheet, 3s. (*J. D. Potter, Agent.*)

America—Great Lakes. **U.S. Weather Bureau.**

Meteorological charts of the Great Lakes, May, 1913. Washington: Department of Agriculture, U.S. Weather Bureau, 1913. *Presented by the U.S. Weather Bureau.*

Atlantic, North. **U.S. Hydrographic Office.**

Pilot chart of the North Atlantic Ocean, March, April, 1913. Washington: U.S. Hydrographic Office, 1913. *Presented by the U.S. Hydrographic Office.*

Atlantic, North. **U.S. Weather Bureau.**

Meteorological chart of the North Atlantic Ocean, May, 1913. Washington: Department of Agriculture, U.S. Weather Bureau, 1913. *Presented by the U.S. Weather Bureau.*

Atlantic, North, and Mediterranean. **Meteorological Office.**

Monthly Meteorological charts of the North Atlantic and Mediterranean, May, 1913. London: Meteorological Office, 1913. *Price 6d. each. Presented by the Meteorological Office.*

Burma. **Hunton and Smith.**

Rangoon river and approaches. Surveyed 1910 and 1911 by A. S. Hunton, F.R.G.S., and V. G. Smith, under the direction of H. G. G. Ashton, F.R.G.S., Deputy-Conservator of the Port Rangoon, 1913. *Presented by the Deputy Conservator of the Port, Rangoon.*

Indian Ocean. **Meteorological Office.**

Monthly meteorological charts of the Indian Ocean, May, 1913. London: Meteorological Office, 1913. *Price 6d. each. Presented by the Meteorological Office.*

Indian Ocean. **U.S. Hydrographic Office.**

Pilot chart of the Indian Ocean, May, 1913. Washington: U.S. Hydrographic Office, 1913. *Presented by the U.S. Hydrographic Office.*

Indian Ocean. **U.S. Weather Bureau.**

Meteorological chart of the Indian Ocean, May, 1913. Washington: Department of Agriculture, U.S. Weather Bureau, 1913. *Presented by the U.S. Weather Bureau.*

Pacific, North. **U.S. Hydrographic Office.**

Pilot chart of the North Pacific Ocean, May, 1913. Washington: U.S. Hydrographic Office, 1913. *Presented by the U.S. Hydrographic Office.*

Pacific, North. **U.S. Weather Bureau.**

Meteorological chart of the North Pacific Ocean, May, 1913. Washington: Department of Agriculture, U.S. Weather Bureau, 1913. *Presented by the U.S. Weather Bureau.*

PHOTOGRAPHS.

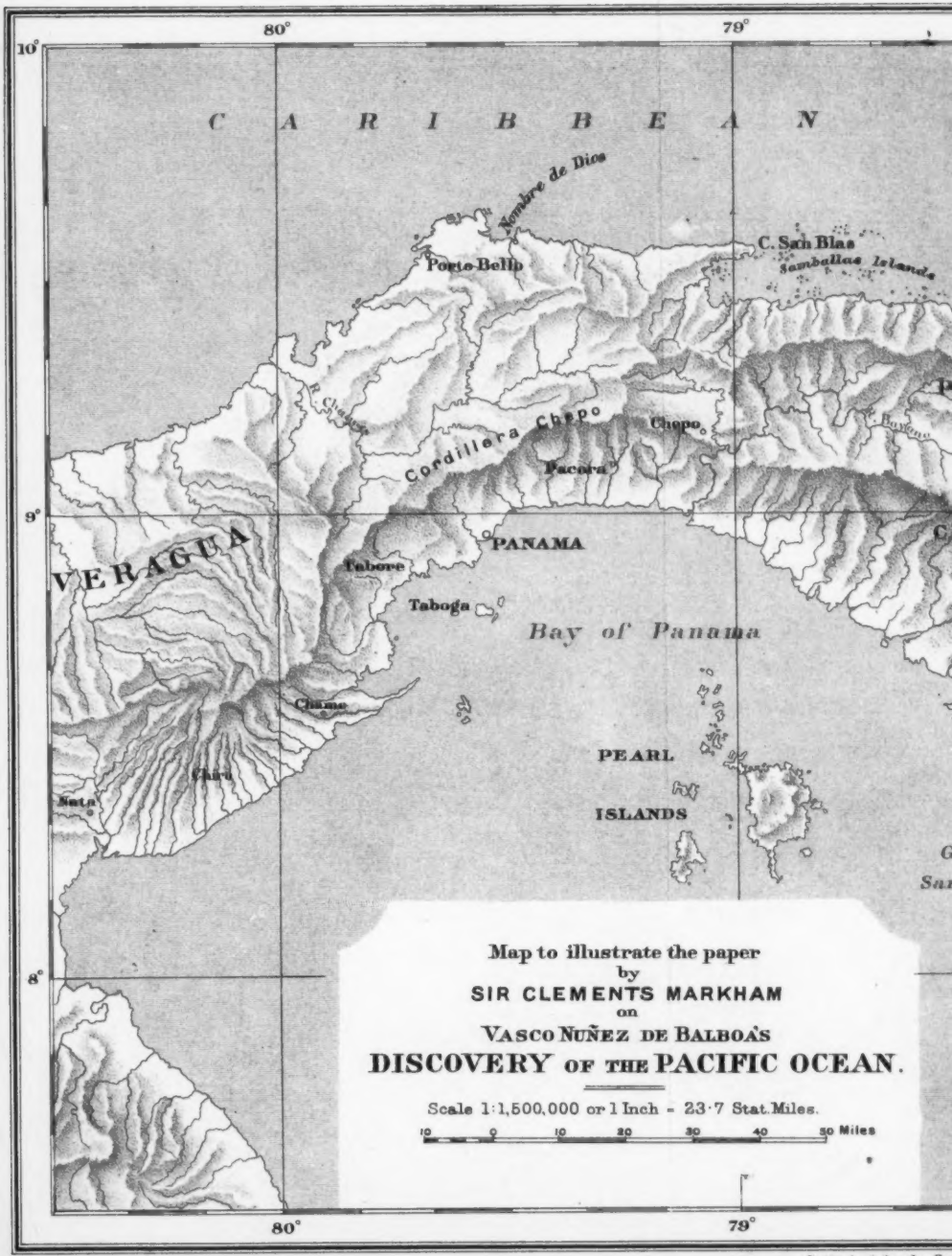
Vancouver island.

Four photographs of the Nitinat district, Vancouver island. *Presented by Captain F. V. Longstaff.*

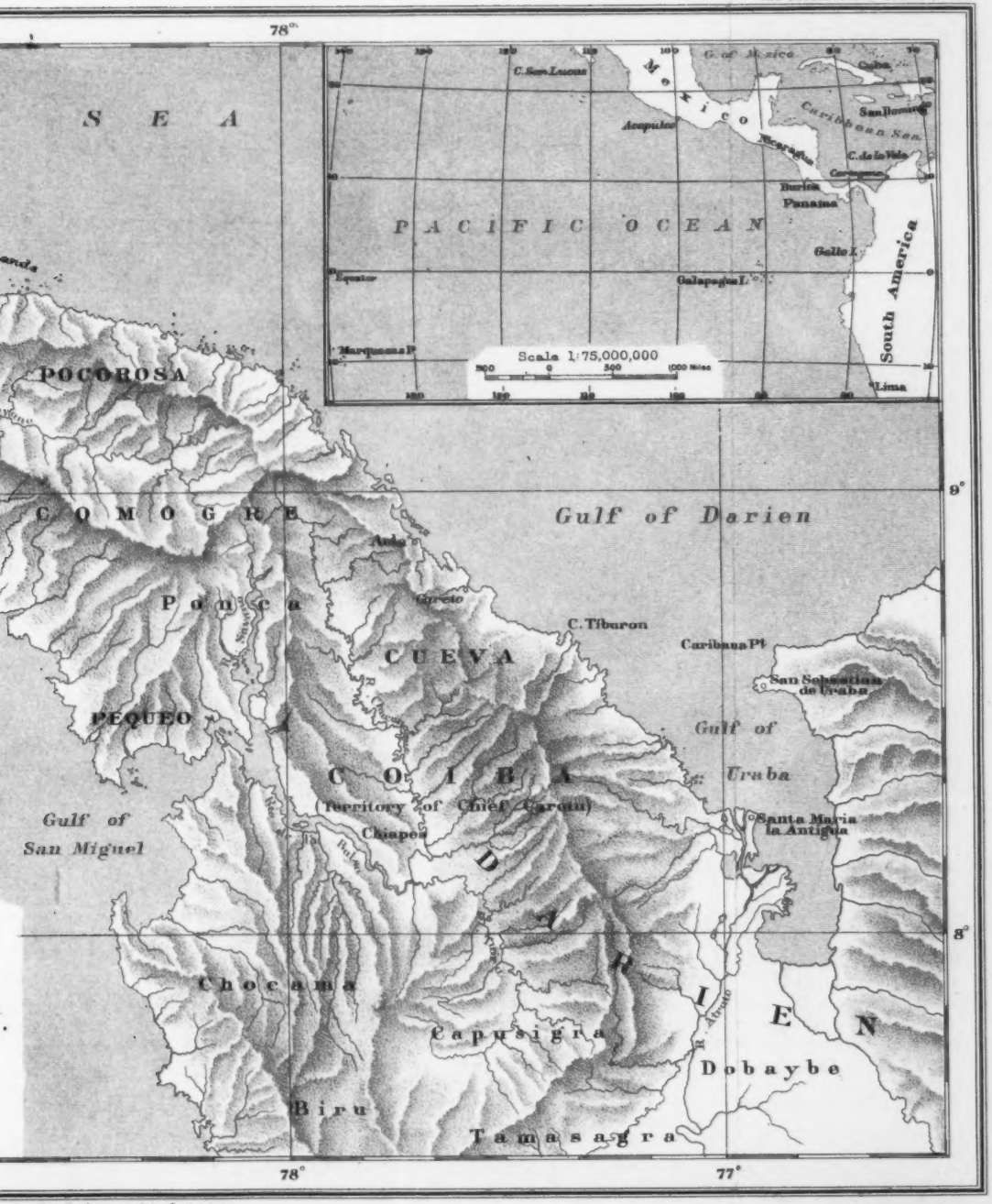
These photographs give an excellent impression of the characteristic scenery of this part of the coast of the island.

(1) The beach, Clo-oose bay; (2) View looking west from Clo-oose bay; (3) Clo-oose bay; (4) Chee-what river.

N.B.—It would greatly add to the value of the collection of Photographs which have been established in the Map Room, if all the Fellows of the Society who have taken photographs during their travels, would forward copies of them to the Map Curator, by whom they will be acknowledged. Should the donor have purchased the photographs, it will be useful for reference if the name of the photographer and his address are given.



Published by the Roy



the Royal Geographical Society

Discovery of the
PACIFIC OCEAN
Markham.

POSITIONS OF MAIN TRIANGULATION STATIONS.

Station.	Latitude S.	Longitude E.	Height.	
			feet	
BURIMBI	0° 59′ 46″·720	29° 50′ 05″·304	8224·2	
CHAMIUMBU	1 00 13·624	30 08 19·108	6167·0	A. G. B. C point
IHUNGA	0 59 41·404	30 02 31·037	7175·0	Do.
KASATORA	1 04 26·361	29 39 37·599	7944·3	
KAVIMBIRI	1 25 47·986	30 03 08·010	7453·4	
KIBUZIGE	1 09 55·669	29 52 41·272	8163·0	
MABAREMERE	1 20 17·380	29 50 49·267	8474·6	
MARAMU	1 19 53·358	30 19 19·073	5054·0	
MBUZI	1 17 55·839	29 28 46·818	6903·7	
MUENDO	1 16 25·220	30 06 45·340	7269·1	
MUHAVURA	1 21 42·734	29 41 23·341	9141·1	Beacon on side
NIRUGONGO	1 09 03·379	30 11 43·459	6396·2	
NKABWA	0 54 02·229	29 35 14·169	6160·0	A. C. B. C. point
RUACHIBI	1 07 04·090	29 59 58·718	7803·6	
RUTEZO	1 09 59·042	29 32 47·125	6598·9	
SANJA	1 28 47·628	29 55 23·656	8010·6	

SECONDARY (RAPID) TRIANGULATION.

			feet	
CHIKOMO	1° 03′ 12″·7	29° 35′ 20″·0	6252	
DWANZU	1 00 44·6	29 40 58·6	6840	
KASUNI	1 51 47·5	29 41 04·9	5391	A. C. B. C. point
KAMBOGA	0 58 02·8	29 44 51·7	6654	
KATAGUWA	0 57 10·4	29 39 53·4	5607	
KIDUHA	1 15 29·8	29 41 24·4	6885	
KIHIMBI	1 10 24·7	29 37 30·0	6832	
MDAGANA	1 18 12·8	29 35 55·1	6878	
NYARUBEBSA	1 21 21·0	29 41 59·3	8239	
NYAWISHENYA	1 05 29·8	29 38 08·4	7305	
RUNGU	1 02 27·6	29 44 35·9	7625	
SALAMBO	0 57 54·4	29 35 30·6	6280	
HILL-TOP	1 01 43·0	29 39 02·2	7556	Not visited

INTERSECTED POINTS.

			feet	
GISHYO	1° 13′ 31″	29° 36′ 09″	6837	
KAHANDAKAMMA ...	1 07 23	30 18 50	4934	
KANYAMINYENYA ...	1 20 22	29 48 13	7882	
KIRAMBO	1 11 28	29 34 21	6389	
MTOTO YA MONGO ...	1 16 04	29 30 37	6328	
MUYEBE	1 19 36	30 02 35	7221	
MUYUMBU	1 27 07	30 04 00	7370	Hill-tops
RUABATAMA	1 21 20	29 50 41	8292	
RUAKWATARO	1 14 17	29 47 45	8298	
RUATAVIKONGORO ...	1 28 01	30 14 53	5077	
WAMUYONYI	1 05 16	29 50 08	8547	
X	1 05 47	29 42 58	7818	
Z	1 09 10	29 44 24	7864	
31	1 24 37	29 49 28	7500	Conspicuous bush
35	1 22 20	30 05 04	7397	Do.
TREE	1 12 18	30 09 15	6721	Conspicuous tree
MUHAVURA	1 23 00·0	29 40 54·5	13547	Volcanoes
MGAHINGA	1 23 07·0	29 38 39·0	11400	
SABINIO	1 23 22·0	29 35 21·0	11960	
VISOKE	1 27 30·0	29 29 01·5	12175	
KARISIMBI	1 30 25·5	29 26 54·0	14780	
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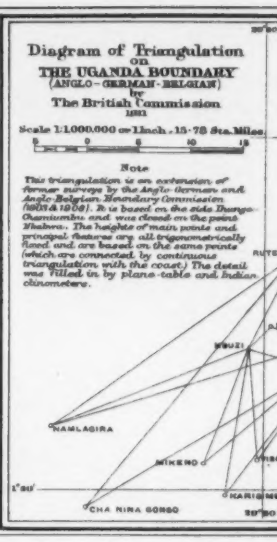

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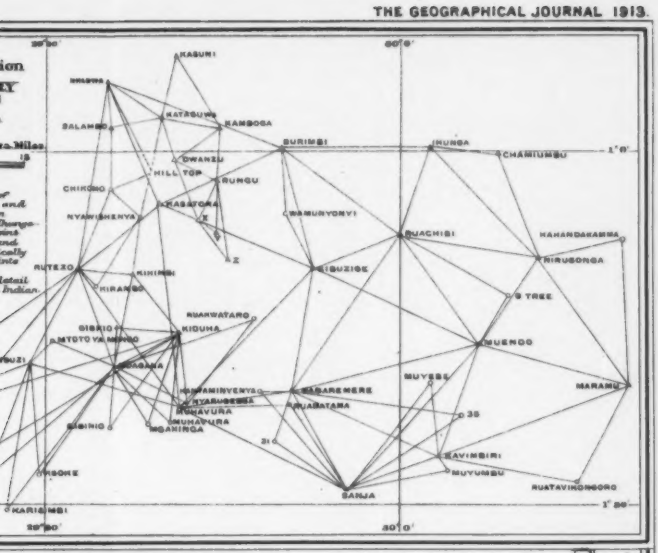

NDA PROTECTORATE

Survey of

MAN-BELGIAN BOUNDARY REGION

by

E BRITISH COMMISSION

under the command of

CAPT. E. M. JACK R.E.

1911.

Reference

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Diagrammatic Sketch of the Long Valley Area looking S.,
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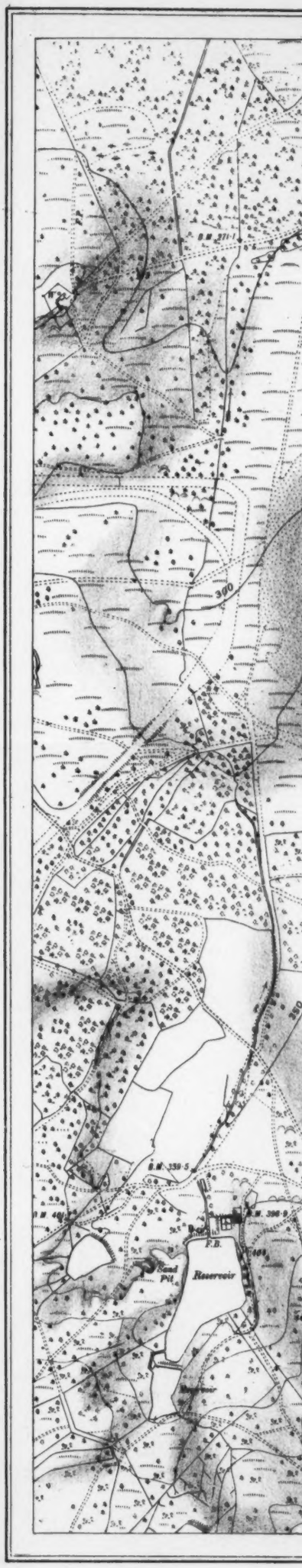

Woods.
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Indicates positions from which Photo

THE "LONG VALLEY" AND ENVIRONS.
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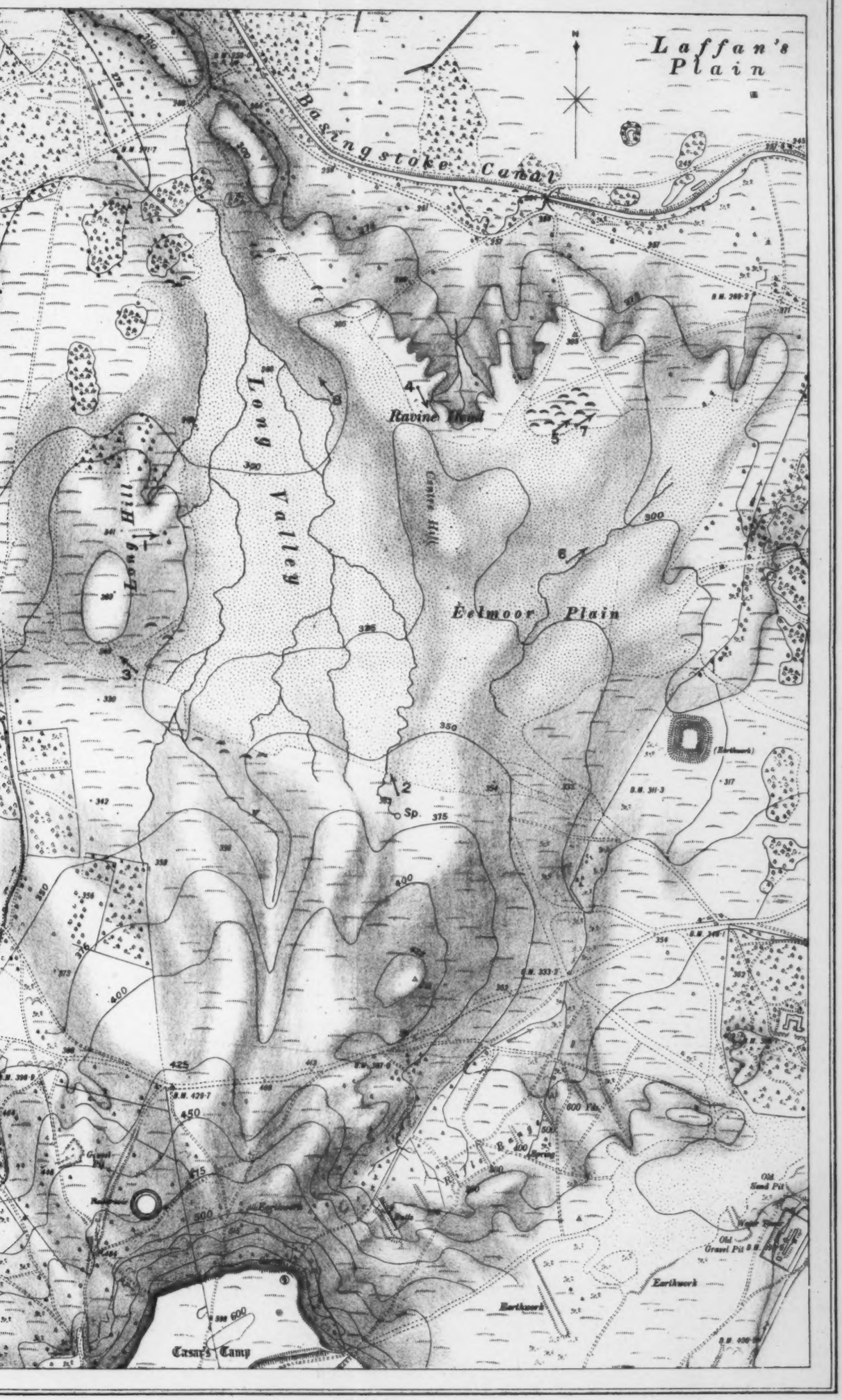

Scale 1:10,560 or 1 Stat. Mile = 6 Inches

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ich Photographs were taken.

Reproduced from the 6-inch Ordnance Survey Sheets, XX N.E., S.E. Hampshire, with the sanction of the Controller of H.M. Stationery Office. Approximate contour lines at 25 ft. intervals and hill shading have been inserted; sand dunes, and the approximate courses of the wadis have been sketched in. Material with which the paper does not deal has been omitted.

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AN ENGLISH DESERT
Ogilvie

INDEX.

* Denotes Articles and Papers. † Bibliographical Entry.
§ Reviews and Notices.

A.

Aar—
Bassin de l'Aar depuis ses sources jusqu'au lac de Bienne, 187 †
Abbot, G., Briefe Description of Whole World, 90 †
Aberystwyth—
Summer Course in Geography at, 393
Abittibi—
Notes sur l'Abitibi: G. C. Piche, 604 †
Abor—
Expedition: Geographical Results: A. Bentinck, 97 *
In Abor Jungles: A. Hamilton, 274 §
Track of the Abor, On: P. Millington, 189 †, 476 §
Abruzzi, Duke of the, Expedition to Western Himalaya, 157
Abyssinia—
Etiopia: osservazioni botaniche, etc.: E. Chiovenda, 601 †
Possibilités économiques de l'Éthiopie: R. Ferry, 405 †
Traversée du massif éthiopien du désert Somali à plaine du Soudan: G. Montandon, 405 †
Adams, G. I., Volcanic character of Timor, 385
Adélie Land, Antarctic, 229
Adkin, G. L., Discovery and extent of former glaciation in Tararua Ranges, New Zealand, 86 †
Admiralty Charts, 95†, 198, 310, 417, 516, 611
Admiralty Library. Subject Catalogue of printed books, 306 †
Adriatic—
Crociere Periodiche, Bollettino delle (International Adriatic Commission), 597 †
Ægean—
Pesca e l'industria della spugne nelle Sporadi meridionali: A. Martelli, 597 †
Aflalo, F., Book of the Wilderness and Jungles, 63 §; remarks on Election of Women as Fellows of R.G.S., 185
Afmadu district, Jubaland, 559
Africa—
Afrikanische Ost-West Ueberlandbahnen: R. Hennig, 508 †
Africa—*continued.*
British East—
Aux sources du Nil par le Chemin de Fer de l'Ouganda: J. Leclercq, 83 †
British Borderland: H. A. Wilson, 602 †
Dracopoli's journey in, 587
Handbook of, 1912: H. F. Ward and J. W. Milligan, 59 §
In heart of Savagedom: Mrs. S. Watt, 190 †
Land of Zinj: C. H. Stigand, 301 †
British West—
Departmental Committee appointed to inquire into matters affecting currency of British West African Colonies and Protectorates, 190 †
Camp and tramp in African Wilds: E. Torday, 405 †
Central—
Inner-Afrika-Expedition, 1910–11: Duke of Mecklenburg, 405 †
Journey by Captain Modat in, 166
Mission Marchand: J. Émily, 190 †
Sociétés primitives de l'Afrique Equatoriale: A. Cureau, 190 †
Thinking black: D. Crawford, 190 †
Chemin de fer transafricain, Mission d'études du: Capt. Nieger, 386, 602 †
Chemins de fer en Afrique et transafricain: V. E. Roume, 405 †
Chemins de fer transsahariens et transafricains: P. Leroy-Beaulieu, 405 †
Chiefs and Cities of Central Africa: O. Macleod, 57 §
Colonization of Africa by Alien races, History of: Sir H. Johnston, 602 †
Dawn in Darkest Africa: J. H. Harris, 191 †, 581 §
Expedition to gold-bearing regions of South-East Africa, MS. Journal of: T. Baines, 90 †
French Equatorial—
Audoin Hydrographical Mission in, 387
Chemin de fer de l'Océan à Brazzaville: J. Mornet, 509 †
Déclinaisons observées en Afrique équatoriale française: G. Bruel, 509 †
Mission d'étude du chemin de fer de

Africa—*continued.*
l'Océan à Brazzaville: J. Mornet, 283 §, 509 †
French West—
Important phénomène de capture dans l'Afrique occidentale: H. Hubert, 83 †
German East—
Am Tendaguru: E. Hennig, 302 †
Deutsch-Ostafrika: G. Schlobach, 509 †
Ergebnisse der Ostafrikanischen Pendel-Expedition: E. Kohlschütter, 302 †
Geographische Forschungen im abflusslosen Gebiet von Deutsch-Ostafrika: F. Jaeger, 509 †
Guide to South and East Africa: A. S. and G. G. Brown, 302 †
Kolonisation Afrikas seit dem Zeitalter des Entdeckungen, Geschichte der Aufteilung und: P. Darmstaedter, 405 †
Kongo zum Niger und Nil, Vom: A. F. Herzog zu Mecklenburg, 302 †
Languages of Africa: A. Werner, 602 †
Languages of West Africa: F. H. Migeod, 407 §, 603 †
Maps: Africa (Geog. Section, General Staff), 196†, 308†, 609†; Afrique Équatoriale Française: E. Barralier, 197 †; Confins Algéro-Tripolitains: Captain Charlet, 415 †; Deutsch-Portugiesischen Grenzgebiets in Südwestafrika: P. Sprigade, 309 †; East Africa Protectorate (Geog. Section, General Staff), 514 †; Geological Map of Union of South Africa (Mines Dept., Geological Survey), 610 †; Kaokofeld (Deutsch-Südwestafrika): J. Kuntz und W. Rux, 308 †; Railway Map of South Africa, 197 †; Usambara- und Kustengebiet in den Bezirken Tanga, Pangani und Wilhelmstal, 609 †
Motorboat, Im, quer durch Afrika: P. Graetz, 168 §, 301 †
North-West: Geological history, 231
Photographs: W. L. Schnaider and others, 419 †; Central Africa: C. Buxton, 199 †
Railway projects in Africa and the near East: Sir H. Johnston, 305 †
South—
Catalogue of books and pamphlets relating to Africa south of Zambesi: G. McC. Theal, 191 †
Farthest point reached by Bartholomew Diaz in 1488: E. H. Schwarz, 595
Historical Geographies: J. R. Fisher, 162 §
Post-Jurassic Earth-movements in South Africa: E. H. Schwarz, 603 †
Prehistoric period in South Africa: J. P. Johnson, 83 †
Africa—*continued.*
South—*continued.*
Reminiscences of South African Pioneer: W. C. Scully, 603 †
Water supply in, 284
'Through Heart of Africa,' letter from F. H. Melland on review of, 77
West—
Frontières de Guinée Française, de Sierra Leone et du Liberia: A. Terrier, 407 †
Languages of West Africa: F. W. H. Migeod, 407 †, 603 †
Populations Géophages de l'Afrique Occidentale: H. Hubert, 407 †
"Verb. Sap." on going to West Africa, etc.: A. Field, 603 †
Voyage de Jan de Herder au Kwango (1642): R. Avelot, 603 †
Agassiz, A. (Biography): H. P. Walcott, 412 †
Agra—
United Provinces of Agra and Oudh, District Gazetteers of: H. R. Nevill and others, 81 †
Ahlmann, H. W., Valle Härad, a kamearea in Westergötland, Sweden, 506 †
Aicardi, G., Distribuzione della popolazione nella riviera ligure, 80 †
Aigner, P. D., Benediktenwandgebirge, 402 †
Akers, C. E., History of South America, 1854-1904..192 †
Alaska—
Chukche peninsula, Alaska and its relation with: N. V. Kirilloff, 603 †
Earthquake at Yakutat Bay, 1899: R. S. Tarr and others, 191 †
Glaciation of Alaska Range: S. R. Capps, 603 †
Headwater regions of Gulkana and Susitna rivers: F. H. Moffit, 191 †
Human and Animal Life in Alaska, 449
Katmai Volcano, Eruption of: G. A. Clark, 387 §, 604 †; Report: I. M. Dailey, 191 †
Meridian, 141st, Exploration and Survey of: D. H. Nellas, 48 *; Meridian, 141st, Surveying the: T. Riggs, 191 †
Musk-ox in Alaska, Probable recent extinction of: J. A. Allen, 449, 509 †
Survey work in Alaska, Progress of: R. H. Sargent, 70
Albania—
Geography and history of, 329
Nordalbanien: G. Kuchinka, 506 †
Aldershot—
English Desert, An: A. G. Ogilvie, 569 *
Alexander, A., Observations astronomiques faites au Spitsberg par l'Expédition Isachsen, 304 †
Alexander, H., Boyd Alexander's last journey, 84 †
Alexander, H. A., Place-names of Oxfordshire, 188 †, 272 §

Alexandra mountains, Antarctic, 13
Alexandretta, branch railway line to, 244, 247
Alexeieff, Colonel, Astronomical points fixed in Altai Mountains in 1909..600 †
Algeria—
Maps: l'Algérie (Gouv. Gén. de l'Algérie), 415 †; Confins Algéro-Tripolitains: Captain Charlet, 415 †
Pflanzengeographische Exkursionen von M. Rikli und C. Schröter and others, 405 †
Railway Routes to Lake Chad from Algiers, 386
Traveller's handbook for Algeria and Tunisia: T. Cook & Son, 190 †
Allegheny—
Trans-Allegheny Region, First explorations by Virginians, 1650–1674: C. W. Alvord and L. Bidgood, 84 †
Allemand-Martin, Dr., Dernier Voyage de Joseph Martin à travers la chine et l'Asie centrale, 600 †
Allen, J. A., Probable recent extinction of musk-ox in Alaska, 509 †
Almagià, R., A proposito di una carta manoscritta d'Italia nella Biblioteca Estense di Modena, 505 †; Neue Untersuchungen... über die Morphologie des Zentral-Apennin, 80 †; Padova e l'Ateneo padoveno nella storia della scienza geografica, 89 †; Più antica carta Stampata della Lombardia, 505 †
Alpine Rivers, Rate of Fall, 501
Alps—
Almenregion, Forschungen in der: R. Sieger, 503 †
Alpenseeaufnahme, Methodik einer, Beiträge zum Atlas der Ostalpenseen und zur: G. Götzinger, 503 †
Bergschrund Observations: B. Stracey, 71
Bewohnten und unbewohnten Areale der Ost-Alpen: N. Krebs, 65 §, 401 †
Building of Alps: T. G. Bonney, 151 §
Cols de Glaciers des Alpes Dauphinoises dans l'Histoire: W. A. B. Coolidge, 186 †
Diluvialen Eiszeit in den Alpen, R. Lepsius über die Einheit und die Ursachen der: A. Penck, 400 †
Englishman in the Alps: A. Lunn, 298 †, 475 §
Erdbeben in den Alpen, Bericht über: J. Schorn, 400 †
Geotektonischen Untersuchungen im östlichen Tauernfenster und seiner weiteren Umrahmung: L. Kober, 503 †
Hochjochferner im Jahre 1907: O. Gruber, 400 †
Percées Alpines: E. Guillot, 186 †
Pflanzengeographie der Ostalpen in den letzten zehn Jahren, Entwickelung der: J. Stadlmann, 401 †
Settled and Unsettled Areas in Eastern Alps: N. Krebs, 65
Seuil de Rives: R. Blanchard, 401 †
Alps—*continued.*
Ski-runs in High Alps: F. F. Roget. 186 †
Volkszählung vom 1910 in den deutsch-österreichischen Alpenländern: R. v. Pfaundler, 401 †
Alt, E., Frostgrenzen und Frosthaufigkeit in Süddeutschland, 402 †, 488 §
Altai—
Astronomical points fixed in Altai Mountains in 1909: Colonel Alexeieff, 600 †
Glaciers of South-Western Altai Mountains, Ancient and Contemporary: V. Rieznichenko, 600 †
Alvord, C. W., and L. Bidgood, First explorations of Trans-Allegheny Region by Virginians, 1650–1674..84 †
America—
Antropogeografi, Ett bidrag till kannedom om Amerikas: E. Nordenskiöld, 604 †
Congress Internacional de Americanistas, Actas del XVII^e, Sesión de Buenos Aires, 604 †
Distribution of animals and its bearing on peopling of America: A. H. Clark, 604 †
Erste Entdeckung Amerikas im Jahre 1000 n. Chr.: G. Neckel, 604 †
Vespucci and naming of America: M. Vignaud, 392
America, Central—
Mission dans l'Amérique Centrale 1909–10: M. de Périgny, 408 †
America, North—
American history and its geographic conditions: E. C. Semple, 303 †
Arctic America, Western, Distribution of Human and Animal Life in: V. Stefansson, 449 *
Climate, Fluctuating, of North America, letter from J. W. Redway on, 75
Deserts, North American, Some physical and biological features of: D. T. Macdougal, 303 †
Faunal divisions of Eastern North America in relation to vegetation: S. Trotter, 604 †
Indian tribes of Upper Missis-ippi valley, etc.: E. H. Blair and others, 84 †
Maps: Geology of Forty-Ninth Parallel: R. A. Daly, 610 †: Meteorological charts of Great Lakes (U.S. Weather Bureau), † 96, 199, 418, 612
Newfoundland Trans-Atlantic Route to North America, Proposed, 172
North America of to-day and to-morrow, and Indiana's place in it: C. R. Dryer, 604 †
Wild life and the camera: A. R. Dugmore, 303 †
Works of Francis Parkman, 84 †, 480 §
America, South—
Aborigines of South America: G. E. Church and Sir C. R. Markham, 408 †

America, South—*continued.*
Familles Linguistiques du Nord-Ouest de l'Amérique du Sud: P. Rivet, 511 †
Flowing Road. Adventuring on great rivers of South America: C. Whitney, 86 †
History of South America, 1854–1904: C. E. Akers, 192 †
Journal des observations physiques . . . faites par l'Ordre du Roy sur les Côtes Orientales de l'Amérique Méridionale: L. Feuillée, 90 †
Land of Peaks and Pampas: J. Page, 605 †
Latin America; its rise and progress: F. Garcia-Calderon, 193 †
Man, Early, in South America: A. Hrdlička and others, 304 †
Observations and impressions: J. Bryce, 85 †
Orinoco and Amazon, Upper Basins of, H. Rice's journeys in, 589
Photographs: W. L. Schnaider and others, 419 †
Reise durch Süd-Amerika im Jahre 1910, Meine: E. Seler, 408 †
Studienreise nach Südamerika: W. Ule, 408 †
American Geographical Society, Celebration of Sixtieth Anniversary of, 349
Amundsen, R., Arctic Expedition, New, 594; Meine Reise zum Südpol, 409 †; Norwegian South Polar Expedition, 1 *; The South Pole, 87 †; review by H. R. Mill, 148
Anadyr, Our extreme North-East: N. T. Kallinikof, 507 †
Anderson, C. L., Old Panama and Castella del Oro, 60 §
Anderson, C. W., Forests of British Guiana, 511 †
Andersson, G., und H. Hesselman, Verbreitung . . . und Anwendung der mittelschwedischen Boden, 187 †
Andersson, K. A., Höhere Tierleben im antarktischen Gebiete, 193 †
Andorra, Hidden Republic: L. G. Leary, 576 §
Andrews, C. W., remarks on "From Victoria Nyanza to Kisii Highlands," 127
Anfossi, G., Materiali per la climatologie d'Italia, 599 †
Angola—
Rohan-Chabot Expedition, 168
Année Cartographique: F. Schrader, 198 †
Annoni, A. M., L'importanza dell' Oasi di Gadamés, 84 †
Ansorge, W. J., et G. A. Boulenger, Poissons recueillis dans Région du Bas-Congo, 508 †
Antarctic—
Amundsen's "South Pole"; A Review: H. R. Mill, 148
Antarctic—*continued.*
Expeditions—
Australian: J. K. Davis, 550 *; Detention of Dr. Mawson in region of Adélie Land, 355; Discovery of important Submarine Banks: T. W. E. David, 461 *; loss of two lives, 228; News from, 595
British: Disaster to Captain Scott's Expedition: address by D. W. Freshfield, 203; address by Lord Curzon, 210; appeal for subscriptions, 206; arrival of survivors, 355, 486; French memorial to Captain Scott, 486; Government Provision for Dependents, 594; Memorial Service at St. Paul's Cathedral, 210; Messages of condolence, 220, 355; obituary of Captain Scott: Sir C. R. Markham, 217; Scott's last message, 201; Second Year's results, 222
French: Deuxième Expedition Antarctique Française (1908–1910): J. Charcot, 605 †
German: Report by Dr. E. Przybyllok, 356; Return of Lieut. Filchner to Buenos Aires, 172
Norwegian: Meine Reise zum Südpol: R. Amundsen, 409 †; Norwegian South Polar Expedition: R. Amundsen, 1 *; The South Pole, 1910–1912: R. Amundsen, 87 †
Scottish: Fortsetzung des antarktischen Fest-landes zwischen Enderby-Land, Coats-Land, und Grahamland: W. S. Bruce, 511 †; Höhere Tierleben im antarktischen Gebiete: K. A. Andersson, 193 †; Names, Antarctic: E. S. Balch, 193 †; Nomenclature of New Lands. Letter from Sir C. Markham, 398; Report on Scientific Results of Voyage of S.Y. *Scotia* 1902–04. Vol. 6, Zoology: W. S. Bruce, 87 †
Swedish: Schwedischen Südpolar-Expedition 1901–03, Wissenschaftliche Ergebnisse der: O. Nordenskjöld, 193 †
Anthiaume, A., Un pilot et cartographe Havrais au XVI^e^ siècle, Guillaume le Testu, 412 †
Anthropogeography—
Géographie humain: J. Brunhes, 88 †
Anthropology—
Notes and queries on anthropology: B. Freire-Marreco and J. L. Myres, 194 †
Antioch—
Colonia Cæsarcia Antiocheia: W. M. Calder, 508 †
Antwerp—
Age géologique des barques primitives trouvées à Anvers 1910–12: G. Hasse, 504 †
Apennines—
Morphologie des Zentral Apennin: R. Almagiá, 80 †

Aquatic animals and their environment: W. J. Dakin, 194 †
Arabia—
Expedition of Royal Danish Geographical Society to Arabia: B. Raunkiær, 189 †
Journey across Arabia by Captain Leachman, 147
Meteorologischen Beobachtungen in San'â, Ergebnisse aus E. Glaser's: J. v. Hann, 82 †
Arabic—
Arabische Pflanzennamen aus Ægypten, Algerien und Jemen: G. Schweinfurth, 89 †
Aral, Lake—
Scientific Results of Lake Aral Expedition: K. Hulsen and M. Sidorenko, 82 †
Araujo, O., Diccionario geografico del Uruguay, 86 †
Arbos, P., Vie pastorale en Tarantaise, 64 §, 79 †
Arctic—
Arctic Prairies: E. T. Seton, 59 §
Expeditions—
Amundsen's, 594; V. Stefansson's, 172, 289, 534
German: Expedition under Lieut. Schröder-Stranz, 171, 289
Norwegian: On bottom deposits from Second Norwegian Arctic Expedition in *Fram*: H. Kiær, 88 †; Report of Second Expedition in *Fram*, 1898–1902: O. Sverdrup and others, 87 †, 584 §
Russian: Progress of, 171
Human and Animal Life in Western Arctic America, Distribution of: V. Stefansson, 449 *
Lost in the Arctic: E. Mikkelsen, 304 †, 481 §
Meteorology (of Second Norwegian Expedition): H. Mohn, 409 †
North-east passage, Expedition by Lieut. Schröder-Stranz, 171
Terrestrial Magnetism: A. S. Steen, 409 †
Ardaillon, E., Notes sur les Touareg Ajjer, 406 †; Oasis de Djanet, 509 †
Ardouin-Dumazet, Voyage en France, 298 †
Arey, A. L., and others, Physiography for High Schools, 162 §
Argentine—
Argentine telle qu'elle est: P. Walle, 192 †, 479 §
Argentinien in geographischer . . . Beziehung: W. Schmidt und C. Grotewold, 303 †
Cultura de Tiahuanaco en région del Noroeste Argentino, Influencias de: S. Debenedetti, 192 †
Ferrocarril transcontinental de San Antonio à Valdivia, Seccion Cordillerana del: B. Willis, 510 †
Vegetación del noroeste de República Argentina, Contribución al conocimiento de la: H. Seckt, 604 †
Aricoma pass, 177
Ariège—
Région montagneuse du Pays de Foix: H. Cavaillès, 401 †
Arizona—
Maps: State of Arizona (Dept. of Interior), 610 †
Armançon, Vallée de: W. M. Davis, 79 †
Armatte, —, Délimitation franco-espagnole au Maroc et ses Conséquences, 509 †
Armenia—
Relation de la huitième Campagne de Sargon: F. Thureau-Dangin, 299 †
Aro tribe, Southern Nigeria, 38
Artaria's Eisenbahnkarte von Österreich-Ungarn und den Balkan-ländern, 196 †
Arthur's Seat, Some observations on Long Row and Wasses: T. C. Day, 506 †
Asia—
Alai and Pamir, Travels in, Collected works of I. V. Mushketof, 600 †
Asia; a geography reader: E. Huntington, 300 †
Central: Dernier voyage de J. Martin à travers la Chine et l'Asie centrale: Dr. Allemand-Martin, 600 †
Europe and the Far East, 1506–1912: Sir R. K. Douglas and J. H. Longford, 601 †
Farmers of Forty Centuries: F. H. King, 601 †
Photographs: W. L. Schnaider and others, 419 †
Tibet, China, and India: P. Landon, 403 †
Vorderasienexpedition 1906 und 1907: H. Grothe, 601 †
Asia Minor—
Géographie Pontique, Notes de: G. de Jerphanion, 508 †
Historischen Topographie von Kleinasien im Mittelalter: W. Tomaschek, 91 †
Kleinasiatischen Rosinen: G. C. Skinas, 82 †
Maps: Karte von Kleinasien: R. Kiepert, 93 †, 608 †
Aston, B. C., Raised beaches of Cape Turakirae, 86 †
Astrolabe à prisme, 268
Atlantic—
Geographie des Atlantischen Ozeans: G. Schott, 88 †, 279 §
Ice Observation in North Atlantic, 289
Legendary islands, Brasil, and of North Atlantic: T. J. Westropp, 89 †
Magnetic declinations and chart corrections in Atlantic Ocean: L. A. Bauer and W. J. Peters, 513 †
Maps: Atlantische Ozean: M. Groll, 310 †; Meteorological Charts (U.S. Weather Bureau), † 96, 199, 418, 612; N. Atlantic and Mediterranean (Met.

Atlantic—*continued.*
Office, London), † 96, 199, 311, 418, 516, 612; Pilot Charts (U.S. Hydrog. Office), † 96, 199, 417, 612
Newfoundland Trans-Atlantic Route, Proposed, 172
Sub-oceanic physiography of North Atlantic: E. Hull, 279 §
Surface temperature of North Atlantic during 1911: M. W. C. Hepworth, 194 †; Effect of Labrador current on surface temperature of North Atlantic: M. W. C. Hepworth, 71 §, 88 †
Trade Winds of, Some long-period fluctuations in: J. S. Dines, 512 †
Atlantis—
Atlantide: P. Termier, 391 §, 606 †
Atlases—
Année Cartographique: F. Schrader, 198 †
Atlante Geografico Muto fisico politico: G. De Agostini, 610 †
Atlas of the World: J. Bartholomew, 416 †
Atlas, sive cosmographicæ meditationes de fabrica mundi et fabricate figura: G. Mercator, 90 †
Calendario-Atlante De Agostini, 1913.. 611 †
Grosser Deutscher Kolonialatlas: P. Sprigade und M. Moisel, 197 †
Handschriftlicher Kartenatlas des Königl. Landesarchivs zu Agram: D. v. Preradović, 411 †
Kriegsgeschichtlicher Atlas zum Studium der Feldzüge der neuesten Zeit: F. Schirmer, 611 †
Meyers historischer Handatlas, 611 †
Neuer Handatlas über alle Teile der Erde: E. Debes, 95 †
Physical and Political School Atlas: J. G. Bartholomew, 416 †
Visual Contour Atlas: G. Philip, 417 †
Atmosphere: *see* Meteorology
Atwood, W. W., Geographic study of Mesa Verde, 84 †
Audoin Hydrographical Mission in French Equatorial Africa, 387
Aurora, oceanographic cruise of, 461
Australasia—
English People Overseas. Vol. 5. Australasia, 1688–1911: A. W. Tilby, 193 †
Visual Instruction Committee of Colonial Office, Lectures prepared for: A. J. Sargent, 408 †
Australasian Antarctic Expedition—
Discovery of important submarine banks by: T. W. E. David, 461 *
Loss of two lives, 228
Australia—
Building of Eastern Australia: H. I. Jensen, 409 †
Caledon Bay prospecting party, Diary of: W. J. McCaw and others, 169 §, 193 †
Australia—*continued.*
Coal Mining in, 288
Maps: Commonwealth of Australia, 197 †
North Australia, By flood and field, Adventures ashore and afloat in: A. Searcy, 87 †
Northern Territory of Australia, Scientific Expedition, Report on, 169
Western: Distribution of native tribes: A. R. Brown, 193 †; Notes on laterite in: E. S. Simpson, 409 †
Australian Antarctic Expedition: J. K. Davis, 550 *
Austria—
Erdbeben, Oesterreichischen Alpen- und Karstländern gefühlten: V. Conrad, 598 †
Kulturen und Volksdichte in österreichischen Alpen, Verteilung der: N. Krebs, 401 †
Mürzgau: J. Mayer, 504 †
Niederösterreichischen Gewitterstationsnetzes, 1902–1905, Ergebnisse der Beobachtungen des: A. Defant, 503 †
People and their homelands: J. Baker, 154 §, 186 †
Volkszählung in Oesterreich, Geographische Ergebnisse der: R. Marek, 487 §, 598 †
Austria-Hungary—
Alpes Orientales et Karpates Septentrionales, Étude Morphologique des: E. de Martonne, 401 †
Flemmings namentreue Länderkarte von Österreich-Ungarn 1: 1,500,000: Baron Steeb, 79 †
Küstenverteidigung, Ueber Österreich-Ungarns: W. Stavenhagen, 79 †
Maps: Artaria's Eisenbahnkarte von Österreich-Ungarn und den Balkanländern, 196 †; Spezialkarte der österreichisch-ungarischen Monarchie, 608 †
Verkehrsgeographische Studien zu einer Isochronenkarte der österreichisch-ungarischen Monarchie: F. Heiderich, 79 †
Auvergne—
Choix de textes précédés d'une étude: L. Bréhier, 298 †
Avelot, R., Une exploration oubliée: voyage de Jan de Herder au Kwango (1642), 603 †
Axel Heiberg glacier, Antarctic, 9
Ayr—
Geographical description of county of Ayr: T. M. Steven, 188 †

B.

Babb, C. C.: *see* Barrows, H. K.
Babylonia, Ancient: C. H. Johns, 405 †
Bacon, G. W. & Co., Excelsior Map of United States, 416 †; Bacon's Island of Barbadoes (Maps), 610 †; Library

Map of Europe, 413 †; New Globe with contour colouring, 95 †
Baedeker, K., Handbooks for travellers: Belgium and Holland, 401 †; Berlin and Environs, 402; Modern Germany, 402 †; Northern Italy, 403 †; Paris Environs, 402 †; Southern Italy and Sicily, 576 §; Spain and Portugal, 599 †
Baffinland—
Death of B. Hantzsch during exploration of Baffinland, 171
Baghdad railway, Progress of, 244
Bagroff, L. S., Materials for historical sketch of maps of Caspian Sea, 600 †
Bahr-el-Ghazal—
Explorations on borders of: by Captain Modat, 166
Bailey, E. B., Bonney's 'Building of the Alps,' 151 §
Bailey, F., obituary, 174
Baines, J., MS. Journal of expedition to gold-bearing region of South-East Africa, 90 †
Baker, B. G., Parsing of Turkish Empire in Europe, 403 †
Baker, J., Austria; her People and their Homelands, 154 §, 186 †
Balch, E. S., Antarctic names, 193 †
Baldensperger, P. J., Immovable East; studies of people and customs of Palestine, 601 †
Baldwin, A. L.: *see* Bowie, W.
Balkans—
Albanien und Montenegro, Durch: H. Grothe, 598 †
Aux pays balkaniques: A. Muzet, 298 †
Balkan Peninsula: D. G. Hogarth, 324 *
Eastern problem, Two possible solutions for: J. Bryce, 598 †
Geographical features, 328
Glaciation du Sarplanina et du Korab: R. T. Nikolić, 79 †
Maps: Carte des Balkans (Service Géog. de l'Armée), 92 †; Ethnographische Uebersichts-karte des europäischen Orients: H. Kiepert, 307 †; General Map of Old Servia and Macedonia: D. J. Derok, 608 †
Political position, 325–328
Serbischen Front, An der: — Vischer, 598 †
Temperature in Balkan Peninsula, Influence of surrounding seas on: P. Vujevich, 79 †
Thrakien und dem Südbulgarischen Rhodopegebirge: F. Meinhard, 401 †
Turkisch-serbische Kriegs-schauplatz: O. Kreutzbruck v. Lilienfels, 401 †
Balls, W. L., Cotton plant in Egypt, 83 †
Baltic—
Hydrographie des Bottnischen und Finnischen Meerbusens, Zusammenfassende Uebersicht der: R. Witting, 473 §
Baltoro and Saltoro, spelling of, letter from Mrs. Bullock Workman on, 398
Baltoro glacier, Himalaya, 156
Bangweulu lake, Livingstone's discovery of, 435
Banks island, Tribes of, 457
Banse, E., Im Osten Mesopotamiens, 405 †, 508 †
Baraize, M. E., Plan des Nécropoles Thébaines, 609 †
Baratta, M., Contribuzione allo studio delle transformazioni idrografiche del delta padano avvenute nel secolo XIX., 505 †
Barbadoes—
Maps: Island of Barbadoes: G. W. Bacon & Co., 610 †
Barclay, W. S., R.G.S. award to, 359
Barjun tribe and district, Jubaland, 556
Barkul Range and Karlik Tagh, Notes on map illustrating explorations in: D. W. Carruthers, 348
Barmouth—
Submerged forest of Llanaber, Note on: T. G. Osborn, 506 †
Barnard, J., Exploration of Upper Irawadi, 166
Barralier, E., Afrique Equatoriale Française (map), 197 †
Barrère, H., Carte Touriste de France, 608 †
Barrion, G., Canal du Djerid, 603 †
Barrow, G., and others, Geology of districts of Braemar, etc., 299 †
Barrows, H. K., and C. C. Babb, Water resources of Penobscot River Basin, Maine, 85 †
Bartholomew, J. G., Atlas of the World, 416 †; Physical and Political School Atlas, 416 †
Bartlett, E. C., Investigations relating to yield of catchment-area in Cape Colony, 284 §, 406 †
Baschmakoff, A., La Tripolitaine et la Cyrenaïque, 603 †
Bassot, M., Sur l'établissement d'une Carte pu Maroc occidental au 1 : 200,000 . . 83 †
Bates, O., History of Eastern Libyans, 508 †
Batusi tribe, Central Africa, 539, 545
Bauer, L. A., Land Magnetic Observations, 1905–1910 . . 607 †, and W. J. Peters, Magnetic declinations and chart corrections in Atlantic Ocean, 513 †; Magnetic declinations and chart corrections obtained by *Carnegie* from Batavia to Manila, etc., 513 †
Bavaria—
Geologische Aufnahme des Gebietes um den Schliersee und Spitzingsee: E. Dacqué, 402 †
Bayan Khara mountains, China, 565
Beaugé, C., Notes sur l'Égypte, 406 †
Beaumont, Sir L., remarks on "Expedition to North-East Greenland," 323
Beaurégard, P. C. de, Guide scientifique du géographe-explorateur, 305 †
Beauvais, G., Côte d'Azur de Marseille à San Remo, 598 †

Becerril, Don L. G., Carta General del Estado de Mexico y del Distrito Federal, 416 †
Becker, F., Linthwerk und seine Schöpfer, 187 †
Beekman, A. A., Geschiedkundige Atlas van Nederland, 414 †
Behrmann, —, Explorations in German New Guinea, 170, 390
Behrmann, W., Oberflächengestaltung des Harzes, 164 §, 186 †; Begleitworte z. d. "40 Blättern der Karte des Deutschen Reiches 1 : 000,000," 402 †
Belgium—
Handbook to Belgium (Ward, Lock & Co.), 475 §; Handbook for travellers: K. Baedeker, 401 †
Hydrografi och vattenbyggnadskonst i Holland och Belgien: R. Smedberg, 402 †
Maps: Atlas des Villes de la Belgique au XVI^e Siècle: J. de Deventer, 196 †; Carte de la Belgique (Inst. Cartographique Militaire), 92 †
Bell, G. L., R.G.S. award to, 359; remarks on "Balkan Peninsula," 337
Bentinck, A., Abor Expedition: Geographical Results, 97 *; letter on Tsangpo and Dihong, 499
Bergon, P., and F. Lalesque, Lac de Cazaux, 401 †
Bergschrund, Observations on: B. Stracey, 71
Berlin—
Handbook for travellers. Berlin and Environs: K. Baedeker, 402 †
Bernard, A., Golfe d'Utique et les bouches de la Medjerdah, 407 †; Le Maroc, 83 †
Bernard, C., Culture du thé à Java, 404 †
Bernet, E., En Tripolitaine, 477 §
Bernhard, H. Wirtschafts- und Siedlungsgeographie des Tösstales, 188 †
Bernhardt, G. de, Handbook of commercial treaties, etc., between Great Britain and Foreign Powers, 411 †
Berry, A. J., Atmosphere, 410 †
Bertacchi, C., Bologna e la Geografia, 504 †
Berthon, P., Étude sur Précolombien du Bas-Pérou, 408 †
Berwick and Lothian Coasts: I. C. Hannah, 600 †
Bethell, L. A., remarks on "Abor expedition," 111
Béthune, G. de, Rapport sur l'organisation d'un service cartographique du Katanga, 508 †
Bews, J. W., Vegetation of Natal, 69
Bhawani Singh, Travel pictures; record of a European tour, 186 †
Bhopal, Nawab Sikandar Begum of, Pilgrimage to Mecca, 90 †
Bichromate battery, Electric charge for, 365
Bidgood, L.: *see* Alvord, C. W.
Bingham, H., Search for last Inca capital 605 †; Vitcos, last Inca capital, 408 †
Birot, J., Statistique annuelle de géographie humaine comparée, 412 †
Bishop, Mrs. J. F., Photographs of China and Korea, 418 †
Blackwelder, E., United States of North America, 303 †
Blair, E. H., and others, Indian tribes of Upper Mississippi Valley, etc., 84 †
Blair, J., Chronology and history of World, 90 †
Blanc, Mont—
Mont Blanc vu de Dijon au XVI^e siècle: H. Mettrier, 400 †
Blanchard, R., Seuil de Rives, 401 †
Blankenhorn, M., Hedschäzbahn, 82 †
Naturwissenschaftliche Studien am Toten Meere und im Jordantal, 82 †
Blatchley, R. S., Illinois petroleum fields, 85 †
Bloch, C., and others, Divisions régionales de la France, 598 †
Blount, J. H., American occupation of Philippines, 1898–1912..301 †
Boam, H. J., and A. G. Brown, British Columbia: its history, people, etc., 303†, 584 §
Bodman, G., Klima als eine Funktion von Temperatur und Windgeschwindigkeit in ihrer Verbindung, 305 †
Bodza river—
Bodzawendung: G. Schilling, 403 †
Boese, E., Ueber die Ursache der letzten grossen Erdbeben von Kalifornien, etc., 510 †
Bogdanovich, C., Tremblement de terre de Tien-Chan, 22 Dec., 1910..189 †
Böhm, A., Begriff und Berechnung der mittleren Neigung einer Gefällskurve, 87 †; Kritischer Böschungswinkel und Kritische Tiefe, 194 †
Bolivia—
Boundary between Peru and Bolivia, letter from H. Toppin on, 295
Excursión del XVII^o Congreso Internacional de Americanistas á Bolivia y Peru: S. Debenedetti, 605 †
Inkas, aus dem Erde der: M. J. von Vacano, 85 †
Linguistique Bolivienne: G. de Créqui-Montfort et P. Rivet, 510 †
Bologna e la Geografia: C. Bertacchi, 504 †
Boloki tribe, Congo, 478
Boni tribe, Jubaland, 557
Bonneville, Ancient Lake of North America, 75
Bonney, T. G., Building of Alps, 151 §; Structure of the Earth, 194 †; Volcanoes: their structure and significance, 607 †
Borneo—
Mineralogy of Borneo: G. P. Chernik, 507 †
Pagan tribes of Borneo: C. Hose and W. McDougall, 190 †, 576 §
Bosnia—
Bilder und Skizzen aus Bosnien und Hercegovina: R. Michel, 298 †

Bosworth, G. F., Cambridge County Geographies. Middlesex, 299 †
Boucher, A., L'Anabase de Xénophon, 301 †
Bouin, Ile de: A. Pawlowski, 401 †
Boulenger, G. A.: *see* Ansorge, W. J.
Bourinot, J. G., Rivière du Désert, 407 †
Bourne river—
Diversions of Bourne near Chertsey: C. N. Bromehead, 163 §, 506 †
Bournemouth—
Climate of Edinburgh and Bournemouth, Comparison of: R. Richardson, 299 †
Bower, Sir H., remarks on "Abor Expedition," 110
Bowers, H. R., obituary, 395
Bowie, W., Some results of Hayford method of gravity reduction, 606 †; and A. L. Baldwin, Triangulation along 98th meridian, 192 †
Bowman, I., Buried wall at Cuzco and its relation to question of a pre-Inca race, 605 †; Cañon of the Urubamba, 491
Boyer, L., De Duponchel à Berthelot, historique du Transsaharien, 406 †
Bradford—
Story of Bradford: M. C. Law, 599 †
Bradley, A. G., Gateway of Scotland, 299 †, 474 §; Herefordshire, 600 †
Branca, W., Müssen Intrusionen norwendig mit Aufpressung Verbunden sein? 410 †
Braun, F., Ueber die Landschaftsnatur der deutschen Weichselufer, 504 †
Braun, G., Beobachtungen eines reisenden Geographen auf der Iberischen Halbinsel, 187 †; Entwicklungsgeschichtliche Studien an europäischen Flachlandsküsten und ihren Dünen, 79 †
Brazil—
Maps: Sul do Brazil: A. Moura, 94 †
Nordbrasilien, Auf neuen Wege in: T. Koch-Grünberg, 510 †
Tikuna, Affinites du: P. Rivet, 511 †
Twentieth Century Impressions of Brazil: R. Lloyd and others, 510 †
Brazzaville Railway, proposed: J. Mornet, 283
Brebner, C. W., South Indian Ocean cyclones of 1911 and 1912..87 †
Bréhier, L., L'Auvergne, 298 †
Brenner—
Brenner pass: C. L. Clare, 575 §
Entwicklungsgeschichte der Brennergegend: J. Gölch, 503 †
Briart, P., Passe de Zinga, 190 †
Bride peak, Karakoram, 157
Bright, Major, remarks on "Mufumbiro mountains," 549
British Borderland: H. A. Wilson, 602 †
British Columbia—
Bear Creek Hydrographic Survey: F. R. Johnson, 303 †
British Columbia, its history, people, etc.: H. J. Boam and A. G. Brown, 303 †, 584 §
British Columbia—*continued.*
Geology and deposits of Phœnix Boundary district: O. E. Le Roy, 407 †
Maps: British Columbia (Dept. of Lands, Victoria, B.C.), 515 †; British Columbia (Dept. of Mines), 309 †
Photographs of Kelowna: G. H. Hudson, 311 †
Wilderness of North Pacific Coast islands: C. Sheldon, 303 †
British Empire—
Englands Weltmacht in ihrer Entwicklung vom 17. Jahrhundert bis auf unsere Tage: W. Langenbeck, 412 †
Surveys of British Africa, Ceylon, etc. (Colonial Survey Committee), 306 †
Bromage, R. R., remarks on Election of Women as Fellows, 185
Bromehead, C. N., On diversions of Bourne near Chertsey, 163 §, 506 †
Brown, A. G.: *see* Boam, H. J.
Brown, A. R., Distribution of native tribes in part of Western Australia, 193 †
Brown, A. S., and G. G., Guide to South and East Africa, 302 †
Brown, J. R., and H. B. Goodwin, Nautical Almanac, 305 †
Brown, P., Picturesque Nepal, 300 †, 579 §
Brown, R. M., Mississippi river flood of 1912..408 †
Brown, R. N. R., Commercial development of Spitzbergen, 410 †
Brown, W. C., and P. H. Johnson, New Outlook Geography. Part II., Europe, 89 †
Bruce, W. S., remarks on "Norwegian South Polar Expedition," 15; Scottish National Antarctic Expedition. Report on Scientific Results, 87 †; Ueber die Fortsetzung des antarktischen Festlandes zwischen Enderby-land, Coatsland und Grahamland, 511 †
Brückmann, R., Beobachtungen über Strandverschiebungen an der Küste des Samlands, 79 †, 281 §
Bruel, G., Déclinaisons observées en Afrique équatoriale française, 509 †
Brunhes, J., Géographie humain, 88 †
Brunhuber, R., An Hinterindiens Riesenströmen, 300 †
Brunswick, Missouri, 137
Brussilof, G., Arctic expedition, 172
Bryant, F. L.: *see* Arey, A. L.
Bryant, H. G., An exploration in South-Eastern Labrador, 303 †, 340 *
Bryce, J., South America. Observations and impressions, 85 †; Two possible solutions for Eastern problem, 598 †
Bucciarelli, L., "Æfula"; contributo alla topografia ed alla storia dell' antico Lazio, 505 †
Buchanan, J. Y., Beobachtungen über die Einwirkung der Strahlung auf das Gletschereis, 411 †; Scientific papers, 410 †
Buchwaldt, F. A., Sfæroidens regnelinje, 606 †

Bufumbira district, Central Africa, 536, 537
Bulgaria—
Maps: Königreich Bulgarien und zentralen Balkanländer zwischen Adria und Pontus: K. Peucker, 413 †
Bullock, F., Fondation de la Colonie Française de la Côte d'Ivoire, 377 §
Bunyoni lake, Central Africa, 540
Burma—
Maps: Chart of Rangoon Harbour: A. S. Hunton and V. G. Smith, 199 †, 612 †
Burrard, S., R.G.S. award to, 358
Butler, R., Frontiers of Central Europe and their defence, 598 †
Buxton, C., Photographs of Central Africa, 199 †

C.

Caballero, G. de J., Notas géológicas sobre la región norte del Estado de Michoacán, 510 †
Cabot, W. B, In Northern Labrador, 479 †
Caddick, D. W., Republic of Chile, 408 †
Cadell, H. M., Story of the Forth, 403 †
Cadiz—
Voyage to Cadiz and Gibraltar, etc.: G. Cockburn, 90 †
Cahen, G., Cartes de Sibérie au XVIII^e siècle, 404 †, 488 §
Cairnes, De L. D., Some suggested new physiographic terms, 194 †
Cairo—
Cairo of to-day: E. A. Reynolds-Ball, 83 †
Meteorological factors of mortality in Cairo and Alexandria: J. I. Craig, 509 †
Significance of Cairo: E. Richmond, 602 †
Calder, W. M., Colonia Cæsareia Antiocheia, 508 †
Caledon Bay prospecting party, Diary of: W. J. McCaw and others, 169 §, 193 †
California—
Englishman's impressions of Golden State: A. T. Johnson, 604 †
Erdbeben von Kalifornien und an der Küste von Mexiko: E. Boese, 510 †
Callot, M., Emploi des Appareils panoramiques dans les levés photographiques, 606 †
Calvert, A. F., Nigeria and its Tin Fields, 158 †
Cambridge—
Geographical Studies at Cambridge, Annual Report of Board of, 173
Camera, Copying, in Surveyor-General's Office: E. Deville, 305 †
Campbell, V. L. A., R.G.S. award to, 358; Antarctic work of, 226
Canada—
Arctic Prairies: E. T. Seton, 59 §
Canada—*continued*.
Commercial Handbook of Canada: E. Heaton and J. B. Robinson, 407 †
Dominion of Canada: P. G. Twining, 407 †
Down Mackenzie and up Yukon in 1906: E. Stewart, 407 †
Geological Congress, Twelfth International, 496
Hydrographical work in 1911–12..286
Journey from Prince of Wales' Fort in Hudson's Bay to Northern Ocean in 1769–1772: S. Hearne, 379 §
Maps: Mineral Map (Dept. of Interior, Ottawa), 309 †; Relief map (Dept. of Interior), 415 †; Sectional Map of Canada (Dept. of Interior, Ottawa), 94 †, 197 †, 416 †, 515 †; Standard Topographic Map of Canada (Dept. of Interior), 610 †; Topographic map of Canada (Dept. of Militia and Defence, Ottawa), 197 †, 309 †, 610; Topographical map showing Mount Robson, etc.: A. O. Wheeler, 309 †
Naval Service, Department of, Report for 1912..191 †
Railway Development in Canada: J. Mallett, 604 †
Weltwirtschaft, Probleme der, Kanada: A. A. Fleck, 604 †
Canary islands—
Photographs: W. L. Schnaider and others, 419 †
Canton—
Mission de M. le Chevalier d'Entrecasteaux à Canton, en 1787: H. Cordier, 404 †
Cape Colony—
Bartholomieu Dias's furthest East: E. H. Schwarz, 595 §, 602 †
Catchment-area in Cape Colony, Investigations relating to yield of: E. C. Bartlett, 284 §, 406 †
Indigenous high forest situated in divisions of George, Knysna, and Humansdorp: J. S. Henkel, 490 §, 509 †
Water-supply, 284
Capps, S. R., Glaciation of Alaska Range, 603 †
Carles, W. R., Richthofen's 'China,' 562 §
Carne, J. E., Antimony-mining industry in New South Wales, 304 †
Caroline islands—
Bilder aus den Karolinen und Marianen: Schnee, 409 †
Carpathians—
Études glaciaires dans les Karpates: L. Sawicki, 80 †
Grenz- und Pässenamen in den Karpathen: G. Czirbusz, 80 †
Orometrie der Fatra-Kriván: E. Löwy, 401 †
Carruthers, D. W., Notes on Maps illustrating Exploration in Mongolia and Dzungaria, 346 *

Carstensz mount, ascent by Dr. Wollaston, 391, 492
Cartography (*see also* Maps)—
Copying camera of Surveyor-General's Office: E. Deville, 305 †
Kartenkunde: M. Groll, 193 †
Portulan du XV^e^ siècle découverte à Gap: C. de la Roncière, 411 †
Carus-Wilson, C., remarks on "An English Desert," 573
Casablanca, Notice économique et administrative: — Dessigny, 406 †
Caspian—
Maps of Caspian Sea, materials for historical sketch of: L. S. Bagroff, 600 †
Vegetation of Transcaspian lowlands, Studies on: O. Paulsen, 578
Castenkiold, M. H. de G., remarks on "Expedition to North-East Greenland," 322
Catalogue—
Admiralty Library. Subject Catalogue of printed books, 306 †
War Office, Catalogue of, Part III. Subject Index, 306 †
Caucasus—
Routes in Western Caucasus, from V. A. Merkulof's guide, 404 †
Cavaillès, H., Région montagneuse du Pays de Foix, 401 †
Cave, C. J. P., Structure of Atmosphere in Clear Weather, 60 §
Cazaux, Lac de: P. Bergon et F. Lalesque, 401 †
Census—
Malthus and some recent census returns: G. G. Chisholm, 513 †
Ceram—
Aanteekeningen betreffende het eiland Ceram of Seran: J. van H. M. Napjus, 507 †
Ceylon—
Einführung in die Tropenwelt; Ceylon: K. Guenther, 581 §
Chad, Lake—
Expedition von Tsad-See zum Nil: Von Wiese, 84 †
Voies d'accès au Lac Tchad: A. J. Wauters, 407 †
Chaillé-Long, C., My Life in Four Continents, 306 †, 484 §
Charcot, J. B., Deuxième Expédition Antarctique Française (1908–10), 605 †; Photographs of Jan Mayen, 311 †; tribute to memory of Captain Scott, 486
Charlet, —, Confins Algero-Tripolitains (map), 415 †
Charts—
Portolan Charts: E. L. Stevenson, 62 §
Charts, New—
Admiralty, † 95, 198, 310, 417, 516, 611
Indischen Ozean, Atlas der Meeresströmungen in den, 418 †
Kystkarter (Norges Geog. Opmaaling), 418 †
Meteorological Charts: Atlantic (U.S. Weather Bureau), † 96, 199, 418, 612; Atlantic, North, and Mediterranean (Met. Office, London), † 96, 199, 311, 418, 516, 612; Great Lakes (U.S. Weather Bureau), † 96, 199, 418, 612; Indian Ocean (Met. Office, London), † 96, 199, 311, 418, 516, 612; Indian Ocean (U.S. Weather Bureau), † 96, 199, 418, 612; Pacific Ocean (U.S. Weather Bureau), † 96, 199, 418, 612
Pilot charts: Atlantic Ocean (U.S. Hydrog. Office), † 96, 199, 417, 612; Indian Ocean (U.S. Hydrog. Office), † 199, 311, 418, 612; Pacific Ocean (U.S. Hydrog. Office), † 96, 199, 311, 418, 612
Chase, J. S., Yosemite Trails, 59 §
Chassigneux, E., L'irrigation dans la delta du Tonkin, 300 †
Chatterton, A.: *see* Molony, J. C.
Chau Ju-Kua: his Work on Chinese and Arab Trade in Twelfth and Thirteenth Centuries: F. Hirth and W. W. Rockhill, 374 §
Chauvigné, A., Territoire et les bois des Clérais, 401 †
Chavannes, E., Documents historiques et géographiques relatifs à Li-Kiang, 507 †
Chekiang river, China, 567
Chernik, G. P., Mineralogy of Borneo, 507 †
Chile—
Maps: Carta Jeografica y Minera (Direccion de Obras Publicas, Santiago), 310 †; Comision Chilena de Limites. Mapas de la Rejion Andina, 94 †
Republic of Chile: D. W. Caddick, 408 †
Chilterns and the Vale: G. Eland, 299 †
China—
Agriculture en Chine: R. van Loo, 403 †
Big Game of Central and Western China: H. F. Wallace, 601 †
Canals, Wonderful, of China: F. H. King, 507 †
Chau Ju-kua: F. Hirth and W. W. Rockhill, 374 §
Conférence de P. Duchesne-Fournet (sur son voyage du Tonkin à Hankeou), 189 †
Dismemberment of China: E. J. Dillon, 300 †
Exploration dans Chine occidentale et les marches tibétaines: A. F. Legendre, 600 †
Explorations in Western China by Dr. Legendre and Captain Noiret, 384
Farmers of Forty Centuries: F. H. King, 601 †
How England saved China: J. Macgowan, 600 †
Langues des peuples non chinois de la Chine: H. d'Ollone, 507 †

China—*continued.*
Manchus, China and the: H. A. Giles, 81 †
Northern China and Korea: J. Marolle, 580 §
Northern China: Valley of Blue river: Madrolle's Guide Books, 300 †
Passe de Nan-Kau et la Grande Muraille: C. Hubert, 403 †
Passing of the Dragon: J. C. Keyte, 600 †
Photographs: Mrs. J. F. Bishop, 418 †
Population of China, Census of 1910: W. W. Rockhill, 300 †
Recueil de nouvelles expressions Chinoises, 507 †
Richthofen's 'China': W. R. Carles, 562 §
Shên-Kan, Through: R. S. Clark and A. de C. Sowerby, 276 §
Si-Ling ou Tombeaux de l'Ouest: C. Hubert, 404 †
Tombeau des Liang, Famille Siao: M. Tchang, 404 †
Treasures, China's: F. McCormick, 507 †
Wayfarer in China: E. Kendall, 601 †
Ching Ting Shan, Northern China, 277
Chiovenda, E., Collezione dei cereali della Colonia Eritrea, 509 †; Etiopia: osservazioni botaniche, etc., 601 †
Chiribiquete range, South America, 590
Chisholm, G. G., Malthus and some recent census returns, 513 †; Pronouncing vocabulary of geographical names, 89 †, 163 §
Cholnoky, E. de, Groupement des montagnes de la Hongrie, 403 †
Christian Antiquities in Nile Valley: S. Clarke, 83 †, 377 §
Chuan, S. H., Most extraordinary city in the world; Notes on Lhasa, 507 †
Chudeau, R., Mission d'études des chemins de fer transafricains, 406 †
Church, G. E., and Sir C. R. Markham, Aborigines of South America, 408 †
Church, J. E., Midwinter trip through Nevada's Mountain Park, 408 †
Cicero—
Il Cielo, la Terra e l'Uomo nelle opere filosofiche di M. Tullio Cicerone: A. Lorenzi, 513 †
Clapp, C. H., Explorations in Southern Vancouver Island, 285 §, 407 †
Clare, C. L., Brenner Pass, 575 §
Clark, A. H., Distribution of animals and its bearing on peopling of America, 604 †; Study of Salinity of Surface Water in North Pacific Ocean, etc., 379 §
Clark, G. A., Eruption of Katmai volcano, Alaska, 387 §, 604 †
Clark, R. S., and A. de C. Sowerby, Through Shên-Kan, 276 §
Clarke, F. W., Some geochemical statistics, 410 †
Clarke, S., Christian Antiquities in Nile Valley, 83 †, 377 §
Cleef, E. van, Geographic Study of Duluth, 85 †
Clendenin, W. W.: *see* Arey, A. L.
Clérais, Territoire et les bois des: A. Chauvigné, 401 †
Clerk, F. V., Exploration of Upper Irawadi, 166
Clerk, H., obituary, 397
Climate—
Klima als eine Funktion von Temperatur und Windgeschwindigkeit in ihrer Verbindung: G. Bodman, 305 †
Clinometer, New Plane-table, 258
Close, C. F., remarks on "Mufumbiro Mountains," 549
Closterhalfen, K., Kartographische Darstellung der Volksdichte, 514 †
Coates & Co., Electric charge for bichromate batteries, 365
Cobbold, Lady E., Wayfarers in Libyan desert, 190 †, 478 §
Cochin-China—
Géographie physique . . . de la Cochinchine, 404 †
Cockburn, G., Voyage to Cadiz and Gibraltar, etc., 90 †
Coffey, G., New Grange (Bragh Na Boinne), 272 §
Coffinières de Nordeck, A., Le Gabon, 406 †
Cole, G. A. J., Description of raised map of Ireland, 188 †; Problem of Liffey Valley, 188 †; and others, Inter-basaltic rocks of Ireland, 506 †
Colima volcano, Mexico, Eruption of, 390
Collins, V. D. B., Triangulation of Teram Kangri: T. G. Longstaff, 300 †
Colombia—
Photographs: J. A. Tregelles, 200 †
Putumayu and question of boundaries between Peru and Colombia: Sir C. Markham, 145 *
Voyage en Colombie: F. Serret, 304 †
Colonial Survey Committee, Surveys of British Africa, Ceylon, etc., 306 †
Colonization—
Wet-bulb thermometer and tropical colonization: J. W. Gregory, 607 †
Colorado—
Glaciation in Telluride Quadrangle: A. D. Hole, 303 †
Columbus—
Resting-place of remains of Columbus: Señor Don E. Deschamps, 514 †
Commerce—
Handbook of Commercial treaties, etc., between Great Britain and Foreign Powers: G. de Bernhardt, 411 †
Progrès du commerce international des "denrées périssables": Hitier, 411 †
Commercial Geography: *see* Geography
Compass—
Admiralty Manual for deviations of compass: F. J. Evans and A. Smith, 410 †
Night marching and prismatic Compass, 366

Compass—*continued.*
Percentage Compass for Navigators etc.: J. C. Fergusson, 515 †
Wireless Compass, 305 †
Congo, Belgian—
Among Congo Cannibals: J. H. Weeks, 82 †, 477 §
Congo river—
Aménagement des passes du bas Congo, 508 †
Navigation of Congo by motor-boat: P. Graetz, 168
Poissons recueillis dans Région du Bas-Congo: W. J. Ansorge et G. A. Boulenger, 508 †
Régime des crues dans réseau fluvial Congolais: M. Roussilhe, 602 †
Conner, C. M., Rice Culture in Philippines, 507 †
Conrad, V., Oesterreichischen Alpen- und Karstländern gefühlten Erdbeben, 598 †
Conrotte, M., Sahara marroqui y la Mauritania, 406 †
Constantinople—
Political position, 326, 327
Conversation, Marlborough's travellers' practical manual of, 307 †
Conway, Sir M., Racstad's 'Spitsberg dans l'histoire diplomatique,' 160 §
Cook and Hammond, Map of Railways of London and Suburbs, 413 †
Cook, T., & Son, Traveller's handbook for Algeria and Tunisia, 190 †
Coolidge, W. A. B., Cols de Glaciers des Alpes Dauphinoises dans l'Histoire, 186 †; Names of Zermatt, 188 †
Cooper, H. L., Utilization of Water-power on Mississippi, 389
Copeland, M. T., Cotton Manufacturing Industry of United States, 604 †
Coral—
Atollen en barrière-riffen in de Oost-Indiese archipel: J. F. Niermeyer, 300 †
Carte de bancs et récifs de coraux: L. Joubin, 606 †
Map, New, of Coral Reefs: L. Joubin, 494
Récifs de coraux et madréporaires dans baie de Tadjourah: C. Gravier, 606 †
Cordier, H., Mission de M. le Chevalier d'Entrecasteaux à Canton, en 1787.. 404 †
Corless, R., On radiation records obtained in 1911 at South Kensington, etc., 188 †
Corney, G., remarks on "Vasco Nuñez de Balboa, 1513–1913," 529
Cornish, Ellen, Travels of: V. Cornish, 306 †
Cornish, V., On Panama Canal, and Formation of Gravitation Waves in Culebra Cut, 239 *; Panama Canal and philosophy of landslides, 408 †; Travels of Ellen Cornish, 306 †
Cornwall—
England's Riviera: J. H. Stone, 371 §
Coronation Gulf islands, 452
Corsica—
Guides-Joanne, Collection des, La Corse: P. Leca, 504 †
Cortes, S., Da Goajira; su porvenir y fuentes de riqueza, 192 †
Cortier, M., and others, Carte de l'Aïr, 93 †
Costa Rica—
Kostarika: H. F. Pittier, 303 †, 479 §
Cotton, C. A., Notes on Wellington Physiography, 87 †
Cox, E. W., remarks on "From Victoria Nyanza to Kisii Highlands," 128
Craig, J. I., Meteorological factors of mortality in Cairo and Alexandria, 509 †
Craig, S., Secrets of the Hills, 163 §
Craigie, W. A., Icelandic Sagas, 599 †
Crampton, C. B., Geological relations of stable and migratory plant formations, 194 †
Crawford, D., Thinking black, 190 †
Crawford, Earl of, obituary, 291
Créqui-Montfort, G. de, and P. Rivet, Linguistique Bolivienne, 510 †
Crimea—
Caves Yel-Khoba and Kharanlyk-Khoba: T. Petrof, 187 †
Crocker Land—
Expedition under D. B. Macmillan, 593
Cross, F. C., New Navigation, 483 §
Crosthwaite, H. L., Investigation of Theory of Isostasy in India, 374 §
Culebra Cut, Panama Canal, Formation of Gravitation Waves in: V. Cornish, 239 *
Cumberland—
Glaciation of Black Combe district: B. Smith, 299 †
Cunha, E. da, Portuguese self-taught, 298 †
Cunningham, E. H.: *see* Barrow, G.
Cureau, A., Sociétés primitives de l'Afrique Equatoriale, 190 †
Currier, C. W., Discovery of historic manuscript of Mexico, 510 †
Curzon, Earl, Appeal for Subscriptions to Scott Memorial Fund, 206
David Livingstone. Centenary of his birth. Introductory Remarks, 421 *
Remarks on: "Abor Expedition," 109, 113; Antarctic Disaster, 210; "Balkan Peninsula," 336; "Expedition to North-East Greenland," 322; "Norwegian South Polar Expedition," 13; Purchase of Lowther Lodge, 180; "Vasco Nuñez de Balboa, 1513–1913," 526
Resolution moved by, for Election of Women as Fellows, 181
Customs of the world: W. Hutchinson, 195 †
Cuzco—
Buried wall at Cuzco and its relation to question of a pre-Inca race: I. Bowman, 605 †
Cyprus—
Handbook of Cyprus: H. C. Lukach and D. J. Jardine, 599 †

Czirbusz, G., Grenz- und Passenamen in den Karpathen, 80 †

D.

Dacqué, E., Geologische Aufnahme des Gebietes um den Schliersee und Spitzingsee, 402 †
Dahome—
Délimitation du Dahomey et du Togo, 602 †
Itinéraire géologique nord-sud du Niger à Savé, à travers le Dahomey septentrional et Central: G. Garde, 508 †
Dailey, I. M., Report of eruption of Katmai Volcano, 191 †
Dainelli, G., Studi sopra la distribuzione della popolazione, 80 †
Dakin, W. J., Aquatic animals and their environment, 194 †
Daly, R. A., Geology of Forty-Ninth Parallel (Maps), 610 †
Daneš, J. V., Capture de la haute Flinders, 511 †; Région des rivières Barron et Russell, 193 †
Danish Minister: *see* Castenkiold, M. H. de G.
Danmark fjord, Greenland, 316
Darmstaedter, P., Geschichte der Aufteilung und Kolonisation Afrikas seit dem Zeitalter des Entdeckungen, 405 †
Darton, N. H. D., Silica and lime deposition, 87 †
Darwin, L., remarks on: "Mufumbiro Mountains," 547; "Notes on Moroccan Geography," 237, 239; "Southern Nigeria, some considerations of its structure," etc., 34
Däubler, —, Klimawirkungen der Tropenländer als Fundament der Akklimatisation, 195 †
David—
Mountain, New Guinea, 591
David, T. W. E., Discovery by Australian Antarctic Expedition of important submarine banks, 461 *; on Dr. Mawson's Antarctic Expedition, 595
Davis, J. K., Australian Antarctic Expedition, 550 *; Discovery of submarine bank off coast of Tasmania, 461
Davis, W. M. (Biography of): E. Huntington, 607 †; Elementary meteorology, 90 †; Relations of Geography and Geology, 495; Vallée de Armançon, 79 †
Davison, C., Death-rate of Earthquakes, 512 †
Day, T. C., Some observations on Long Row and Wasses, Arthur's Seat, 506 †
Dayak tribes of Sarawak, 577
De Agostini, G., Atlante Geografico Muto fisico politico, 610 †; Calendario-Atlante, 611 †
Debenedetti, S., Excursión del XVII° Congreso Internacional de Americanistas á Bolivia y Perú, 605 †; Influencias de cultura de Tiahuanaco en région del Noroeste Argentino, 192 †
Debes, E., Neuer Handatlas über alle Teile der Erde, 95 †
Decker-David, P., Agriculture indigène en Tunisie, 603 †
Defant, A., Ergebnisse der Beobachtungen der niederösterreichischen Gewitterstationsnetzes, 503 †; Klima von Innsbruck mit besonderer Rücksicht auf den Föhn, 503 †; Veränderungen in der allgemeinen Zirkulation der Atmosphäre in den gemassigten Breiten der Erde, 411 †
De Geer, G., Coal Region of Central Spitsbergen, 493 §, 606 †; Geological excursion to Central Spitzbergen, 511 †; Kontinentale Niveauveränderungen im Norden Europas, 79 †
Delaney, L. T.: *see* Lloyd, R.
Denmark—
Maps: Topografisk kaart over Kongeriget Danmark, 92 †
Derok, D. J., General Map of Old Servia and Macedonia, 608 †
Deschamps, Don E., Resting-place of remains of Columbus, 514 †
Descharmes, R., Histoire cartographique des Pyrénées-Orientales, 505 †
Deshek Wama, British East Africa, 464
Desiccation—
Globe, Dessiccation du: L. Dumas, 410 †
Desmoines rapids, Mississippi, Utilisation as Water-power, 389
Dessigny, —, Casablanca, Notice économique et administrative, 406 †
Deventer, J. de, Atlas des Villes de la Belgique au XIV° Siècle, 196 †
Deville, E., Copying camera of Surveyor-General's Office, 305 †
Dias, Bartholomieu, Furthest East: E. H. Schwarz, 595 §, 602 †
Diaz del Castillo, B., True history of conquest of New Spain, 191 †
Dicks, A. J., Cambridge Geographical Text-Books, Intermediate, 162 §
Dihong—
Dihong river, Central Asia, 98, 107, 111
History of Exploration of Upper Dihong, letter from J. A. Field, 291
Letters on Tsang-po and Dihong, from A. Bentinck, 499, and C. Du Riche Preller, 500
Dillon, E. J., Dismemberment of China, 300 †
Dinaric ranges, Balkan peninsula, 338
Dines, J. S., Some long-period fluctuations in Trade Winds of Atlantic, 512 †
Dines, W. H., and W. N. Shaw, Free atmosphere in region of British Isles, 188 †
Discovery, A book of: M. B. Synge, 89 †
Diver, M., Hero of Herat, 89 †
Djupar mountains, China, 565

Donazzolo, P., Viaggi in oriente ed in occidente del Fratello Francesco Maria di S. Siro, 513 †
Dondi, Jacopo, Il trattato della marea di: P. Revelli, 513 †
Douglas, C. G., and others, Physiological observations made on Pike's Peak, 607 †
Douglas, Sir R. K., and J. H. Longford, Europe and the Far East, 1506–1912.. 601 †
Douglas, W. B., letter on Mountain Sickness, 399
Douxami, H., Tremblements de terre ou Séismes dans région du Nord de France, 186 †
Dracopoli, J. N., Journey in British East Africa, 587
Drake-Brockman, D. L.: *see* Nevill, H. R.
Dryer, C. R., North America of to-day and to-morrow, and Indiana's place in it, 604 †
Dublin—
Neighbourhood of Dublin: W. St. J. Joyce, 371 §, 403 †
Duchesne-Fournet, P., Conférence de (sur son voyage du Tonkin à Hankeou), 189 †
Duclos, —, Rapport de tournée: In-Salah, Hassi-Boughessa, etc., 406 †
Dugmore, A. R., Wild life and the camera, 303 †
Duignan, W. H., Warwickshire place-names, 81 †
Duluth, Geographic study of: E. van Cleef, 85 †
Dumas, L., Dessiccation du Globe, 410 †; Pluie normale théorique, 411 †
Dume river—
Erkundung des Dume und des Mara, Bericht über eine: Lieut. Tamm, 302 †
Dunstan, W. R., Report on results of mineral survey of Southern Nigeria, 1910..302 †
Dupuis, J., obituary, 174
Dvorsky, V., Alcune osservazioni sopra le sedi umane sulla costa fra Serchio e Magra, 504 †
Dwight, Margaret van Horn, Journey to Ohio in 1810 as recorded in Journal of: M. Farrand, 192 †
Dzungaria—
Frontiers of Jungaria: V. A. Obrucheff and others, 189 †
Maps illustrating exploration in Mongolia and Dzungaria. Notes on: D. W. Carruthers, 346*

E.

Earth—
Earth: its shape, size, weight and spin: J. H. Poynting, 410 †
Fizeausche Methode zur Erforschung des Erdinnern: H. Löwy, 88 †
Land und Wasser auf der Erdoberfläche: H. Wagner, 88 †
Rigidity of the Earth, Tides and: A. E. Love, 513 †
Earth—*continued.*
Structure of the earth: T. G. Bonney, 194 †
Earthquakes (*see also* Seismology)—
Death-rate of Earthquakes: C. Davison, 512 †
Détermination de profondeur du foyer d'un tremblement de terre, etc.: Prince B. Galitzine, 194 †
Graphical construction for epicentre of an earthquake: G. W. Walker, 194 †
Haiti, Earthquake sounds at, 389
Stereographische Methode zur Herdbestimmung von Erdbeben: O. Klotz, 194 †
East—
Ancient History of Near East: H. R. Hall, 607 †
Strategical geography of Near East: H. J. Mackinder, 412 †
East Indies, Dutch—
Telegraafnet, Voorgenomen uitbreiding en verbetering van het Nederlandsch-Indische: W. F. G. Oosterbeek, 489 §, 507 †
Easter island—
Research Expedition by W. S. Routledge, 494
Tres notas sobre la Isla de Pascua: W. Knoche, 304 †
Eastwick, E. B., Journal of a diplomat's three years' residence in Persia, 90 †
Eckert, M., Wirtschaftsgeographische und handelspolitische Bedeutung der Weltmeere, 513 †
Ecuador—
Tesoro del Itschimbia: J. Jijon y Caamaño, 192 †
Edinburgh—
Climate of Edinburgh and Bournemouth, Comparison of: R. Richardson, 299 †
Edwards, H. T.: *see* Sherard, S. H.
Eerde, J. C. van, Het onderzoek van den Rindjani en zijne omgeving, 300 †
Egerton, Sir W., remarks on "Southern Nigeria; some Considerations of its Structure," etc., 36
Egypt—
Cotton, Effect of water on cultivation of: H. T. Ferrar and H. E. Hurst, 508 †, 587 §
Cotton plant in Egypt: W. L. Balls, 83 †
Eastern Desert Expedition of 1912: W. F. Hume, 191 †
Grammar of modern Arabic of Egypt, New: S. Spiro Bey, 191 †
Maps: Plan des Nécropoles Thébaines: M. E. Baraize, 609 †; Topographical Map of Egypt (Survey Dept.), 415 †
Mémoires géographiques et historiques sur l'Égypte: E. Quatremère, 91 †
Notes sur l'Égypte: C. Beaugé, 406 †
Soda Deposits, Natural, in Egypt: A. Lucas, 406 †

Egypt—*continued.*
Trade *viâ* Port Sudan, Report for 1911 on (Consular Reports), 602 †
Eifel—
Gebirgsbau der Eifel: G. Fliegel, 504 †
Eland, G., Chilterns and the Vale, 299 †
Elbe—
Niederelbe: R. Linde, 599 †
Elbert, J., Sunda-Expedition des Vereins für Geographie und Statistik zu Frankfurt am Main, 190 †
Elephant hunter, Adventures of an: J. Sutherland, 195 †
Elgee, F., Moorlands of North-Eastern Yorkshire, 189 †
Ellesmere Land—
Oberdevonische Flora des Ellesmere-Landes: A. G. Nathorst, 409 †
Vascular plants in flora of Ellesmere Land: H. G. Simmons, 409 †, 584 §
Elliott, F., Jubaland and its inhabitants, 554
Elliott, M. S., An elementary historical geography of British Isles, 403 †
Ellis, G. W., Liberia in political psychology in West Africa, 406 †
Elmendorf, D. L., A camera crusade through Holy Land, 601 †
Elrod, M. J., Some lakes of Glacier National Park, 85 †
Elwin, E. F., India and the Indians, 601 †
Emerson, F. V., Geographical Interpretation of Missouri, 39 *, 130 *
Émily, J., Mission Marchand, 190 †
Enciso, Martin Fernandez de, 518
England—
Can Germany invade England? H. B. Hanna, 81 †
England's Riviera: J. H. Stone, 371 §
Inland transport and communication in England, History of: E. A. Pratt, 299 †
England and Wales—
Maps: Ordnance Surveys, †92, 196, 307, 413, 514, 608
English Desert, An: A. G. Ogilvie, 569 *
Epry, C., Ripple-marks, 606 †
Erichsen, M., Search by E. Mikkelsen for traces of, 313
Eritrea—
Collezione dei cereali della Colonia Eritrea: E. Chiovenda, 509 †
Erosion—
Schützende Rolle des Meer- und Flusswassers bei der Abtragung: E. Solger, 606 †
Erving, W. G., Medical report of Yale Peruvian Expedition, 304 †
Eskimo—
Alaska, North, Eskimo of, 450, 451
Geräte der Eskimo, Ueber einige: M. P. Porsild, 511 †
Labrador, Among Eskimos of: S. K. Hutton, 378 §
Mackenzie Land, Eskimo of, 452, 453
Tribes of Arctic coast of North America, 457
Eskimo—*continued.*
White Eskimo discovered by Mr. Stefansson, 459
Ethnology—
Probleme der ethno-psychologischen Forschung: R. Thurnwald, 88 †
Etna—
Grande eruzione etnea del Settembre, 1911: G. Platania, 80 †
Topographischen Umgestaltungen auf dem Ätna: A. Sieberg, 80 †
Europe—
Entwicklungsgeschichtliche Studien an europäischen Flachlandsküsten und ihren Dünen: G. Braun, 79 †
Far East, Europe and the: Sir R. K. Douglas and J. H. Longford, 601 †
Frontiers of Central Europe and their defence: R. Butler, 598 †
Kontinentale Niveauveränderungen im Norden Europas: G. De Geer, 79 †
Maps: Bacon's Library Map of Europe, 413 †; Generalkarte von Mitteleuropa, 196 †, 608 †; Uebersichtskarte von Europa, 92 †; Uebersichtskarte von Mitteleuropa (K. Preuss. Landesaufnahme), 308 †
Topographie, Hydrographie..der europäischen Seen: W. Halbfass, 512 †
Travel pictures; record of a European tour: Bhawani Singh, 186 †
Evans, Commander, Honour for, 595
Evans, Sir A., remarks on "Balkan Peninsula," 337
Evans, F. J., and A. Smith, Admiralty Manual for deviations of compass, 410 †
Ewing, C. M., Geographical description of East Lothian, 506 †
Eyre, E. J., Life of: H. Hume, 90 †

F.

Færoes—
Færöer. Studien und Wanderfahrten: K. Küchler, 598 †
Falconer, J. D., remarks on "Southern Nigeria; some Considerations of its Structure," etc., 37
Falls, J. C. E., Three Years in Libyan Desert, 406 †
Fanning, P. R., Natural bridge on Luksuhim stream in Philippines, 386
Faris, R. L., Results of Magnetic Observations made by Coast and Geodetic Survey, 192 †
Farrand, M., Journey to Ohio in 1810.. 192 †
Fars—
Description of the province of Fars at beginning of twelfth century: G. Le Strange, 404 †
Fatra-Krivan, Orometrie der: E. Lõurg, 401 †
Fawcett, P. H., letter on mountain sickness, 178
Feldwick, W.: *see* Lloyd, R.
Fenner, C. N.: *see* Hrdlicka, A.

Fergusson, J. C., Percentage Compass for Navigators, etc., 515 †
Fernandez, Juan, Discoveries of, 523
Ferrar, H. T., and H. E. Hurst, Effect of water on cultivation of cotton, 508 †, 587 §
Ferry, R., Possibilités économiques de l'Éthiopie, 405 †
Feruglio, G., Termometro a rovesciamento Richter e tavole per la sua correzione, 512 †
Fessler, A., Klimatographie von Salzburg, 598 †
Feuerstein, A., Entwicklung der Kartenbildes von Tirol bis um die Mitte des 16. Jahrhunderts, 282 §, 401 †
Feuillée, L., Journal des observations physiques . . . faites par l'Ordre du Roy sur les Côtes Orientales de l'Amérique Méridionale, 90 †
Field, A., "Verb. Sap." on going to West Africa, etc., 603 †
Field, J. A., letter on History of Exploration of Upper Dihong, 291
Field, T., Radley district; its history, etc., 403
Filchner, W., Ergänzungsband zum Kartenwerk Nordost-Tibet, 601 †; Return of Antarctic Expedition to Buenos Aires, 172; and H. Mueller, Bilder aus Kan-su, 189 †
Filippi, F. de, Karakoram and Western Himalaya, 1909..81 †, 156 §
Finch, R. J., Questions and exercises in Geography, 163 §, 412 †
Finlason, W. F., History of Jamaica case, 90 †
Firth river, Alaska, 54
Fischer, P. O., Italien als Mittelmeermacht, 80 †
Fischer, Theobald: K. Oestreich, 195 †
Fisher, J. R., Historical Geographies. South Africa, 162 §
Fleck, A. A., Probleme der Weltwirtschaft, Kanada, 604 †
Flett, J. S., and J. B. Hill, Geology of Lizard and Meneage, 506 †
Fliegel, G., Zum Gebirgsbau der Eifel, 504 †
Flinders, General De Caen's report on detention of, 607 †
Flinders river—
  Capture de haute Flinders: J. V. Daneš, 511 †
Florence—
  Wanderer in Florence: E. V. Lucas, 154 §
Flores, E. G., Guinea Española, 407 †
Florida—
  Florida Trails: W. Packard, 59 §
  Triangulation along east coast of Florida: H. C. Mitchell, 192 †
Fordham, Sir H. G., Cartographie des provinces de France, 1594–1757..186 †; Notes on British and Irish Itineraries and road-books, 189 †
Forfarshire—
  Cambridge County Geographies. Forfarshire: E. S. Valentine, 81 †
Formosa—
  Historical and geographical description of Formosa: G. Psalmanasaar, 91 †
Fortescue, Hon. J., Narrative of visit to India of King George and Queen Mary, 81 †, 580 §
Forth—
  Maps: Bathyorographical map of Forth and Tay: W. & A. K. Johnston, 413 †
  Story of the Forth: H. M. Cadell, 403 †
Fossey, J., and J. Longnon, Haute Normandie, 298 †, 474 §
Four Continents, My Life in: Colonel Chaillé-Long, 306 †, 484 §
Fram, Polar work of, 150, 151: Report of Second Norwegian Arctic Expedition in, 1898–1902..584 §
France—
  Cartographie des provinces de France 1594–1757: Sir H. G. Fordham, 186 †
  Côte d'Azur de Marseille à San Remo: G. Beauvais, 598 †
  Côtes du Golfe du Lion, Étude bathylithologique des: J. Thoulet, 598 †
  Divisions régionales de la France: C. Bloch and others, 598 †
  Étang de Thau: L. Sudry, 598 †
  Etudes glacialogiques: M. Mougin, 401 †
  Géographie illustrée: P. Jousset, 298 †
  Maps: Carte de France (Service Géog. de l'Armée), 414 †; Carte de France (Ministre de l'Interieur), 414 †; Carte Michelin, 414 †; Carte Touriste de France: H. Barrère, 608 †; Chemins de Fer Français (Service Géog. de l'Armée), 414 †
  Memorial de Dépôt Général de la Guerre, T. xi., xiii., 90 †
  Tarantaise, La vie pastorale en: P. Arbos, 64 §, 79 †
  Tremblements de terre ou Séismes dans région du Nord de France: H. Douxami, 186 †
  Voyage en France: Ardouin-Dumazet, 298 †
Franz Josef Land—
  French Scientific Expedition under J. de Payer, 289
Frech, F., Ueber den Gebirgsbau des Taurus, 405 †
Freer, P. C., Result of . . . study of tropical sunlight, 195 †
Freeston, C. L., Passes of the Pyrenees, 298 †
Freire-Marreco, B., and J. L. Myres, Notes and queries on anthropology, 194 †
Freitas, J. de, Visconde de Santarem. Opusculos e esparsos, 195 †
French colonies—
  French Colonial History, Society for Study of, 174
  Time in French Colonies, 290
French Memorial to Captain Scott, 486

Freshfield, D. W., Address on Antarctic Disaster, 203; remarks on: "Distribution of Human and Animal Life in Western Arctic America," 459, 460; "From Victoria Nyanza to Kisii Highlands," 126
Friederichsen, M., Vorpommerns Küsten und Seebäder, 371 §
Friederici, G., Beiträge zur Völker- und Sprachenkunde von Deutsch Neuguinea, 86 †; Sprachenkarte von Neu-Mecklenburg, 310 †; Südsee-Inseln, 87 †
Friedlaender, I., Karten des Eruptionskegels des Vesuv und des Vesuvkraters, 403 †
Friuli—
Idografia dei bacini della Meduna e del Colvera in Friuli: G. Stefanini, 505 †
Frost-lines in Southern Germany: E. Alt, 488
Fryer, J., A new account of East India and Persia, 1672–1681..300 †
Fukien river, China, 567
Fuller, M. L., New Madrid earthquake, 85 †
Fuller, Sir B., Empire of India, 189 †, 579 §
Furlong, C. W., Travels in Patagonia and Tierra del Fuego, 85 †

G.

Gabon, Le: A. Coffinières de Nordeck, 406 †
Gaillard, E., Alps de Savoie, 474 §
Gala tribe, Jubaland, 558
Galitzine, Prince B., Détermination de profondeur du foyer d'un tremblement de terre, etc., 194 †
Ganguly, M. M., Orissa and her remains, 189 †
Garcia-Calderon, F., Latin America; its rise and progress, 193 †
Garde, G., Itinéraire géologique nord-sud du Niger à Savé, 508 †
Gazetteer—
Lippincott's New Gazetteer: A. & L. Heilprin, 306 †
Geerligs, P., World's Sugar-Cane Industry Past and Present, 63 §
Genoese World-Map, 1457: E. L. Stevenson, 62 §
Gentil, L., Géologie du Maroc, 406 †; Maroc physique, 157 §
Geochemical statistics, some: F. W. Clarke, 410 †
Geo-graph Book, Philips': J. H. Hack, 416 †
Geographer, Task of the: E. Huntington, 495
Geographical Discovery, in Seventeenth and Eighteenth Centuries, History of: E. Heawood, 381 §
Geographical Exploration—
Guide scientifique du géographe-explorateur: P. C. de Beauregard, 305 †
Geographical Literature of Month—
Africa, 82, 190, 301, 405, 508, 601
America, 84, 191, 303, 407, 508, 603
Anthropogeography and Historical Geography, 88, 194, 306, 411, 513, 607
Asia, 81, 189, 299, 403, 507, 600
Australasia and Pacific Islands, 86, 193, 304, 408, 511
Biography, 89, 195, 306, 412, 514, 607
Europe, 79, 186, 298, 400, 503, 597
General, 89, 195, 306, 412, 607
Mathematical Geography, 87, 193, 305, 410, 512, 606
Physical and Biological Geography, 87, 305, 410, 512, 606
Polar Regions, 87, 193, 304, 409, 511, 605
Geographical Names—
Pronouncing Vocabulary of Geographical Names: G. G. Chisholm, 89 †, 163 §
Geographical Society, American, Celebration of Sixtieth Anniversary of, 349
Geographical Surveying, Some new and improved instruments and apparatus for: E. A. Reeves, 249 *, 359 *
Geography—
Annales de Géographie. Deuxième table décennale 1902–11: L. Raveneau, 412 †
Cambridge County Geographies, Middlesex: G. F. Bosworth, 299 †
Cambridge Geographical Text-Books—Intermediate: A. J. Dicks, 162 §
Elementary Geography: F. D. Herbertson, Vols. 5 and 6..162 §
Geografia cientifica: W. S. Tower, 412 †
Géographie humain: J. Brunhes, 88 †
Historische Geographie und Geschichte der Erdkunde: S. Günther, 411 †
Lehrbuch der Geographie: H. Wagner, 307 †
New Outlook Geography. Part II. Europe: W. O. Brown and P. H. Johnson, 89 †
New Preliminary Geography: H. B. Wetherill, 162 §
New science of Geography: E. Huntington, 412 †
Oxford Geographies. Geography of British Empire: A. J. Herbertson and R. L. Thompson, 89 †
Oxford School of Geography, Report for 1912..496
Padova e l'Ateneo padovano nella storia della scienza geografica: R. Almagià, 89 †
Physical geography, An Introduction to: M. I. Newbigin, 161 §
Physical Geography, Class Book of: A. T. Simmons and E. Stenhouse, 161 §
Practical and experimental geography: F. Morrow and E. Lambert, 607 †
Questions and exercises in geography:

Geography—*continued.*
IV. North America: R. J. Finch, 163 §, 412 †
Relations of Geography and Geology: W. M. Davis, 495
Scientific geography. Book VIII. South America: E. W. Heaton, 412 †
Statistics in teaching of geography, Use of: B. C. Wallis, 306 †
Statistique annuelle de géographie humaine comparée, 1912: J. Birot, 412 †
Summer Course in Geography at Aberystwyth, 393
Wirtschaftsgeographische und handelspolitische Bedeutung der Weltmeere: M. Eckert, 513 †
World Geography for Junior Students, Essentials of: J. F. Unstead and E. G. R. Taylor, 162 §
Geoid—
Geoidabstande nach der Formal von Stokes bei schemtatischen Schwerebelegungen: R. Schumann, 88 †
Geological Congress, Twelfth International, in Canada, 496
Geology—
Müssen Intrusionen notwendig mit Aufpressung Verbunden sein? W. Branca, 410 †
Relations of Geography and Geology: W. M. Davis, 495
Geomorphology—
Interprétation géographique des paysages: P. Vidal de la Blache, 410 †
Gerbing, L., Ehemalige Verbreitung der Slaven in Südwest-Thüringien, 504 †
Gerini, G. E., Siam and its productions, arts and manufactures, 301 †
German colonies—
Maps: Grosser Deutscher Kolonialatlas: P. Sprigade und M. Moisel, 197 †
German Crown Prince, From my Hunting Day-Book, 63 §
Germany—
Astronomisch-geodätische Arbeiten im Jahre 1911 (K. Preuss. Geod. Institut), 80 †
Bau und Bild des Landehuter Kammes und seines Vorlandes: O. Nafe, 504 †
Begleitwarte zu den "40 Blättern der Karte des Deutschen Reiches 1:100,000:" W. Behrmann, 402 †
Benediktenwandgebirge: P. D. Aigner, 402 †
Deutschen Nordseeküste, Beiträge zur morphologischen Entwicklungsgeschichte der: W. Ordemann, 504 †
Evolution of modern Germany: H. Lichtenberger, 599 †
Formen der deutschen Dörfer und ihre Verbreitung: A. Wolkenhauer, 383 §, 402 †
Frostgrenzen und Frosthaufigkeit in Süddeutschland: E. Alt, 402 †, 488 §
Germany—*continued.*
Handbook for travellers: Modern Germany: K. Baedeker, 402 †
Maps: Karte des Deutschen Reiches (K.Preuss.Landesaufnahme), †92,308; Karte des Deutschen Reichs im Massstab, 1:500,000: C. Vogel, 414 †
Natürlichen Landschaften der Rheinpfalz: D. Häberle, 599 †
Niederschlagsverhältnisse zwischen Bodensee und Donau: J. Götz, 402 †
Pflanzenwonderungen längs der Ill, des Rheines und der Eisenbahn: E. Krause, 66 §, 79 †
Regenfalls in Norddeutschland, Ergebnisse zehnjähriger Registrierungen des: G. Hellmann, 504 †
Regenkarten der Provinz Schlesien: G. Hellmann, 79 †
Sandbänke an der Küste der Deutschen Bucht der Nordsee: H. Poppen, 80 †
Sommerregen in Norddeutschland, Ueber den Charakter der: G. Hellmann, 402 †
Warnowgebietes, Beitrag zur Landeskunde des: H. Tischbein, 402 †
Geuljik lake, Turkey in Asia, 165
Ghadames—
Oasi di Gadamés, Importanza dell': A. M. Annoni, 84 †
Gibbs, H. G., Study of effect of tropical sunlight upon men, etc., 195 †
Gibraltar, Voyage to Cadiz and: G. Cockburn, 90 †
Giles, H. A., China and the Manchus, 81 †
Gilgai country in New South Wales, 288
Gill, Sir D., remarks on "Some new and improved Instruments for Geographical Surveying," 369
Giorgievich, T. R., Influence de l'economie sur l'évolution des habitations, 187 †
Girard, A., Émigration espagnole, 505 †
Girouard, Sir P., remarks on "From Victoria Nyanza to Kisii Highlands," 126
Glacial Epoch—
Dernière période glaciaire en Europe et dans l'amérique du Nord, etc.: N. J. Krischtafowitsch, 410 †
Glacier National Park, Some lakes of: M. J. Elrod, 85 †
Glaciers—
Ausfüllung eines Sees vor dem Engabrä als Mass der Gletscher-erosion: J. Reckstad, 411 †
Strahlung auf das Gletschereis, Beobachtungen über die Einwirkung der: J. Y. Buchanan, 411 †
Totes Gletschereis als Bestandteil der Moränenlandschaft: R. v. Klebelsberg, 411 †
Variations périodiques des Glaciers: C. Rabot et E. Muret, 410 †
Glasgow—
Glaser, E.: *see* Hann, J. v.
Maps: County of City of Glasgow as divided into Municipal Wards: A. B. M'Donald, 307 †

Globe—
Bacon's New Globe with Contour Colouring, 95 †
Goajira—
Da Goajira; su porvenir y fuentes de riqueza: S. Cortes, 192 †
Gobwein, East Africa, 463
Godwin-Austen, H. H., letter on spelling of Saltoro and Baltoro, 175
Gölch, J., Zur Entwicklungsgeschichte der Brennergegend, 503 †
Gold Coast—
Historische verhael van het Gout Koninchrijck van Guinea anders de Gout-Custe de Mina genaemt: P. de Marees, 302 †
Goldthwait, J. W., Former Glaciation in New England, 490
Gonzalez, P. A., Situacion, extension, y limites del Estado de Tabasco, 510 †
Goodacre, H. H., Philips' Practical Map-reading Cards, 95 †
Goodman, H. B.: *see* Brown, J. R.
Gortani, M., Falde di detrito e coni di deiezione nella valle del Tagliamento, 505 †
Götz, J., Niederschlagsverhältnisse zwischen Bodensee und Donau, 402 †
Götzinger, G., Kartierung der Lunzer Seen, 503 †
Goulven, J., Océanie française et Canal de Panama, 511 †
Graetz, P., Im Motorboot quer durch Afrika, 168 §, 301 †; Proposed crossing of New Guinea by airship, 170
Gran Paradiso—
Secondo saggio di nuove ricerche sui ghiacciai del G. Paradiso: V. Monti, 503 †
Granö, J. G., Nordwest-Mongolie, 404 †
Grant, J., Narrative of a voyage of discovery . . . to New South Wales, 90 †
Gravier, C., Récifs de coraux et madréporaires dans baie de Tadjourah, 606 †
Gravier, G., Sanjak of Novibazar, 468 *
Gravity—
Hayford method of gravity reduction, Some results of: W. Bowie, 606 †
Gray, C. P., Aero View of Panama Canal, 416 †
Greater Rome and Greater Britain: Sir C. P. Lucas, 411 †
Greece—
Maps: Griechenland und das Ägäische Meer: K. Peucker, 92 †
Twentieth Century, Greece of the: P. F. Martin, 186 †
Green bay, Newfoundland, 173
Greenland—
Astronomical and geodetical observations: G. Isachsen, 409 †
Etnografiske og antropogeografiske Rejsestudier i Nord-Grønland 1909: H. P. Steensby, 605 †
Expedition to North-East Greenland, 1909-12: E. Mikkelsen, 313 *
Expedition in Northern Greenland by K. Rasmussen, 593
Greenland—*continued.*
Exploration du Grönland: C. Pergameni, 511 †
Ice-cap of, 315
Lost in the Arctic: E. Mikkelsen, 304 † 481 §
Nyopdagede Nordbo-Ruiner; Julianehaab-Distrikt: E. Jespersen, 605 †
Plants and ferns of North-West Greenland: H. G. Simmons, 409 †, 585 §
Vascular plants of West Greenland: M. P. Porsild, 605 †
Gregory, J. W., Wet-bulb thermometer and tropical colonization, 607 †
Greim, G., Schätzung der Mittleren Niederschlagshöhe im Gressherzogtum Hessen, 504 †
Grein, K., Eine elektrische Lampe zum Anlocken positiv phototaktischer Seetiere, 512 †; Vorläufige Mitteilung über photographische Lichtmessungen im Meer, 290 §, 512 †
Grew, E. and M. S., Rambles in Holland, 402 †
Griffis, W. E., A modern pioneer in Korea, 300 †
Grigorief, S., Earthquake in Semirechensk, 82 †
Grimaud, —, Rohan-Chabot Expedition in Angola, 168
Grinlinton, —, Notes on Poting Glacier, 300 †
Groll, M., Atlantische Ozean. Indische Ocean. Stille Ozean, 310 †; Kartenkunde, 193 †
Gross, A., and F. Waite-Browne, Premier Road Book of Great Britain, 600 †
Grotewold, C.: *see* Schmidt, W.
Grothe, H., Durch Albanien und Montenegro, 598 †; Meine Vorderasienexpedition 1906 und 1907..601 †
Gruber, O., Hochjochferner im Jahre 1907..400 †
Guadalquivir, its Personality, etc.: P. Gwynne, 575 §
Guenther, K., Einführung in die Tropenwelt, Ceylon, 581 §
Guest, A. R., Delta in middle ages. Note on branches of Nile, 301 †
Guggisberg, F. G., Handbook of Southern Nigeria Survey, 56 §; Southern Nigeria (map), 197 †
Guiana, British—
Forests of British Guiana: C. W. Anderson, 511 †
Guiana, Dutch—
Astronomische plaatsbepaling van eenige punten in Suriname: A. J. von Stockum, 511 †, 590 §
Corantijn-Expeditie, Verslag der: C. C. Käyser, 511 †
Eerste uit Nederland naar Suriname gezonden landmeters: F. E. Mulert, 511 †
Guilbert, G., Nouvelle méthode de prévision du temps, 305 †
Guillaume, P., Note sur un portulan de la

Mediterranée et d'une partie de l'Atlantique, 411 †
Guillot, E., Les Percées Alpines, 186 †
Guinea, French—
Frontières de Guinée Française: A. Terrier, 302 †, 407 †
Guinea, Spanish—
Guinea Española: E. G. Flores, 407 †
Gulf Stream—
Grandest and most mighty terrestrial phenomenon: J. E. Pillsbury, 305 †
Günther, S., Historische Geographie und Geschichte der Erdkunde, 411 †
Gur, Lough, Certain Megalithic remains immediately surrounding: C. A. Windle, 299 †
Gurkhas tribe, Nepal, 580
Gutenberg, B., Seismische Bodenunruhe, 194 †
Gwasi mountain, British East Africa, 115
Gwynne, P., Guadalquivir, 575 §
Gya La Dzong, Central Asia, 292
Gyala Sindong, 98

H.

Haberlandt, A., Trinkwasserversorgung primitiver Völker, 89 †
Häberle, D., Natürlichen Landschaften der Rheinpfalz, 599 †‖
Hack, J. H., Philips' Geo-graph Book, 416 †
Haddon, A. C., Hose's 'Pagan Tribes of Borneo,' 576 §; remarks on "Distribution of Human and Animal Life in Western Arctic America," 459
Hahn, K. F., Autobiographie von Dr. Radde, 514 †
Haiti—
Earthquake sounds at Haiti, 389
Earthquakes, Great, in Island of Haiti: J. Scherer, 511 †
Halbfass, W., Topographie . . . der europäischen Seen, 512 †
Hale, A., Port of Pará, 605 †
Hale, H. O., Kinematograph in school, 306 †
Hall, H. R., Ancient history of Near East, 607 †
Hamada Country: G. W. Murray, 602 †
Hambruch, P., Ponape, 409 †
Hami, position of, Mongolia, 348
Hamilton, A., In Abor Jungles, 274 §
Handel-Mazzetti, Freiherrn v., Zur Geographie von Kurdistan, 82 †, 165 §
Hann, J. v., Ergebnisse aus E. Glaser's meteorologischen Beobachtungen in San'â, 82 †; Täglichen Änderungen der Windstärke auf dem Gipfel des Ben Nevis, 411 †
Hanna, H. B., Can Germany invade England? 81 †
Hannah, I. C., Berwick and Lothian Coasts, 600 †
Hänsen, J., Carte topographique du Grand Duché de Luxembourg, 307 †
Hanssen, P. T.: *see* Thimm, C. A.
Hantzsch, B., death of, in Baffinland, 171
Hardenburg, W. E., Putumayo: Devil's Paradise, 192 †, 481 §
Harris, J. H., Dawn in Darkest Africa, 191 †, 581 §
Harrison, E. J., Fighting spirit of Japan, 189 †
Harz mountains—
Oberflächengestaltung des Harzes: W. Behrmann, 164 §, 186 †
Vergletscherung des Harzvorlandes: K. Wünschmann, 402 †
Hasse, G., Age géologique des barques primitives trouvées à Anvers en 1910–12..504 †
Hassert, K., Seenstudien in Nord-Kamerun, 83 †
Hatcher, J. B., Geography of Southern Patagonia, 90 †
Hausa—
Hausa superstitions and customs: A. J. Tremearne, 407 †, 582 §
Haverfield, F., Roman London, 299 †; Romanization of Roman Britain, 272 §
Havre—
Port du Havre, Transformations du: J. Levainville, 504 †
Hawes, A. F.: *see* Hawley, R. C.
Hawley, R. C., and A. F. Hawes, Forestry in New England, 85 †
Hayes, Sir John, his voyage and life: I. Lee, 195 †
Hayford, J. F., Isostasy: a rejoinder to article by Harmon Lewis, 305 †
Haywood, A. H. W., Through Timbuctu and across Great Sahara, 278 §
Haywood, C. W., Lorian Swamp, 463 *
Headlam, C., Provence and Languedoc, 153 §
Hearne, S., Journey from Prince of Wales Fort in Hudson's Bay to Northern Ocean in 1769–1772. Edited by J. B. Tyrell, 379 §
Heaton, E. W., A scientific geography. Book VIII. South America, 412 †
Heaton, E., and J. B. Robinson, Commercial Handbook of Canada, 407 †
Heawood, E., A History of Geographical Discovery in Seventeenth and Eighteenth Centuries, 381 §
Hedin, S., Ein Warnungsruf, 187 †; From Pole to Pole, 195 †, 585 §
Hedjaz railway—
Hedschâzbahn: M. Blanckenhorn, 82 †
Heemskerck, Cornelis: J. W. Ijzerman, 513 †
Heiderich, F., Verkehrsgeographische Studien zu einer Isochronenkarte der österreich-ungarischen Monarchie, 79 †
Heilprin, A. and L., Lippincott's New Gazetteer, 306 †
Heindl, R., Meine Reise nach den Strafkolonien, 306 †
Helland-Hansen, B., and F. Nansen, Sea west of Spitsbergen, 512 †
Hellman, G., Ergebnisse zehnjähriger Begistrierungen des Regenfalls in

Norddeutschland, 504 †; Regenkarte der Provinz Schlesien, 79 §; Ueber den Charakter der Sommerregen in Norddeutschland, 402 †
Helmer Hansen mountain, Antarctic, 10
Henderson, G., Account of British settlement of Honduras, 90 †
Henkel, J. S., Forestry in Cape Colony, 490; Indigenous high forest . . . in George, Knysna, and Humansdorp, Cape Province, 490 §, 509 †
Hennig, E., Am Tendaguru, 302 †
Hennig, R., Afrikanische Ost-West Ueberlandbahnen, 508 †; Stellung der Sibirischen Ströme im Weltverkehr, 82 †
Henrici, E. C., remarks on "Some new and improved Instruments for Geographical Surveying," 369
Hepworth, M. W. C., Effect of Labrador current upon surface temperature of North Atlantic, 71 §, 88 †; Surface temperature of North Atlantic during 1911..194 †
Herat, Hero of: M. Diver, 89 †
Herbertson, A. J., and R. L. Thompson, Geography of British Empire, 89 †
Herbertson, F. D., The Elementary Geography, vols. 5 and 6..162
Herderschee, F., Explorations in New Guinea, 170
Hereford—
Cambridge County Geographies. Herefordshire: A. G. Bradley, 600 †
Herzegovina—
Bilder und Skizzen aus Bosnien und Hercegovina: R. Michel, 298 †
Herzfeld, E., Erster vorläufiger Bericht über die Ausgrabungen von Samarra, 301 †
Hessen—
Niederschlagshöhe im Grossherzogtum Hessen, Schatzung der mittleren: G. Greim, 504 †
Hettner, A., Alter und Form der Täler, 607 †
Heyse, R., Mappa da Viação Ferrea de São Paulo e Partes dos Estados Vizinhos, 94 †
Hibben, F. N., & Co., Map of Vancouver Island and adjacent mainland of British Columbia, 94 †
Hill, J. B.: *see* Flett, J. S.
Hill, J. M., and W. Lindgren, Mining districts of Western United States, 408 †
Hill, Sir C. L., obituary, 498
Hills, Secrets of the: S. Craig, 163 §
Himalaya—
Karakoram and Western Himalaya, 1909: F. de Filippi, 81 †, 156 §
Ontdekingsreiziger in de Himalaya en in Tibet (1624–1630): C. Wessels, 300 †
Photographs of Himalayas: G. S. Ingram, 200 †
"Saltoro" and "Baltoro," letter from H. H. Godwin-Austin on spelling of, 175
Hinks, A. R., International one-in-a-million map of world, 606 †; Map Projections, 278 §
Hirth, F., and W. W. Rockhill, Chau Ju-Kua, 374 §
Hitier, —, Progrès du commerce international des "denrées périssables," 411 †
Hoar, G. E., Tables of allowance for current, 193 †
Hoel, A., Explorations in Spitsbergen, 592; and O. Holtedahl, Nappes de lave, volcans et sources thermales dans environs de Baie Wood au Spitsberg, 304 †
Hogarth, D. G., Balkan Peninsula, 324 *
Hogben, G., Earthquake-origins in South-Western Pacific in 1910..87 †
Holderness, erosion in, 370
Holdich, Sir T. H., remarks on: "Abor expedition," 112; "Some new and improved Instruments for Geographical Surveying," 368, 369
Hole, A. D., Glaciation in Telluride Quadrangle, Colorado, 303 †
Holland—
Glaziales Stauchungsprofil bei Arnheim: K. Oestreich, 504 †
Handbook for travellers, Belgium and Holland: K. Baedeker, 401 †
Hillegom, Het verzonken gat te: J. Lorié, 504 †
Hydrografi och vattenbyggnadskonst i Holland och Belgien: R. Smedberg, 402 †
Maps: Geschiedkundige Atlas van Nederland: A. A. Beekman, 414 †
Nederlandsche Vluchtheuvels, geographisch beschouwd: R. Schuiling, 186 †
Rambles in Holland: E. and M. S. Grew, 402 †
Holmes, A., and W. A. Wray, Outlines of geology of Mozambique, 302 †
Holmes, W. H.: *see* Hrdlicka, A.
Holness, A., remarks on election of women as Fellows, 185
Holtedahl, O.: *see* Hoel, A.
Honduras—
British settlement of Honduras, Account of: G. Henderson, 90 †
Hooker, Sir J. D., 1817–1911: Sir W. T. Thiselton-Dyer, 412 †
Hoosac Valley: its legends and its history: G. G. Niles, 303 †
Hose, C., and W. McDougall, Pagan tribes of Borneo, 190 †, 576 §
Hosseus, C. C., Stammpflanze des offizinellen Rhabarbers, etc., 512 †
Hotchkiss, W. O., and F. T. Thwaites, Map of Wisconsin showing Geology and Roads, 515 †
Houtsma, M. T., and M. Seligsohn, Encyclopædia of Islam, 307 †
Hrdlička, A., Early man in South America, 304 †

Hubert, C., Passe de Nan-Kau et la Grand Muraille, 403 †; Si-Ling ou Tombeaux de l'Ouest, 404 †
Hubert, H., Populations Géophages de l'Afrique Occidentale, 407 †; Sur un important phénomène de capture dans l'Afrique occidentale, 83 †
Hudson, G. H., Photographs of Kelowna, British Columbia, 311 †
Hudson Bay—
Hydrographic surveys, 286
Observations de Jens Munk dans le baia d'Hudson en 1619 et 1620: B. Rolf, 513 †
Hudson river—
Storm King crossing of Hudson river: J. F. Kemp, 84 †
Hull, E., Physical history of Norwegian Fjords, 599 †; Sub-Oceanic Physiography of North Atlantic Ocean, 279 §
Hulsen, K, Bottom samples from Lake Aral, 82 †
Hume, H., Life of Edward John Eyre, 90 †
Hume, W. F., Eastern Desert Expedition of 1912..191 †
Hungary—
Artesischen Brunnen des grossen Ungarischen Alföld: L. v. Lóczy, 80 †
Besiedelung von Nyiregyhaza und seiner Tanya's: G. Simkó, 403 †
Montagnes de la Hongrie, Groupement des: E. de Cholnoky, 403 †
Hunstein peak, German New Guinea, 170
Hunter, W. H., Rivers and Estuaries, or Streams and Tides, 607 †
Hunting Day-Book: From my: H.I.H. German Crown Prince, 63 §
Huntington, E., Asia: a geography reader, 300 †; Climatic Changes in Mexico, 588; New science of Geography, 412 †; Peninsula of Yucatan, 604 †; Task of the Geographer, 495; William Morris Davis, Geographer, 607 †
Hunton, A. S., and V. G. Smith, Chart of Rangoon Harbour, 199 †, 612 †
Hurst, H. E.: *see* Ferrar, H. T.
Hutchinson, W., Customs of the world, 195 †
Hutter, F., Neu-Kamerun, 509 †
Hutton, E., Cities of Lombardy, 154 §; Ravenna, a study, 599 †
Hutton, S. K., Among Eskimos of Labrador, 378 §; Photographs of Eskimos in Labrador, 312 †
Hyde, W. W., Thessaly and Vale of Tempe, 599 †
Hydrography—
Hydrometrische Versuche: J. W. Sandström, 194 †
Hydrology—
Tidal boundary-waves and related hydrodynamical problems: N. Zeilon, 88 †
Hyslop, J. and R., Langholm as it was, 154 §

I.

Iberian peninsula—
Reisenden Geographen auf der Iberischen Halbinsel: G. Braun, 187 †
Iboland, Nigeria, people of, 25–32
Ice—
Atlantic, North, ice observations in, 289
Iceland—
Botany of Iceland: L. K. Rosenvinge and E. Warming, 80 †
Sagas, Icelandic: W. A. Craigie, 599 †
Ijzerman, J. W., Cornelis Heemskerck, 513 †
Illinois—
Petroleum fields: R. S. Blatchley, 85 †
Imhoff, L., Letzte Vulkan in Samoa, 511 †
Im Thurn, Sir E., remarks on "Vasco Nuñez de Balboa, 1513–1913," 528
Incas—
Origenes de los Incas: M. Uhle, 605 †
Search for last Inca Capital: H. Bingham, 605 †
Index—
Annales de Géographie: Deuxième table décennale, 1902–11: L. Raveneau, 412 †
India—
Archæological Survey of India, Annual Report: Sir M. A. Stein, 507 †
Big Game Shooting in India, Burma, and Somaliland: V. M. Stockley, 607 †
Census of India, 1911. Vol 12, Madras: J. C. Molony and A. Chatterton, 404 †; Ditto, vol. 11, Coorg. Report and Tables: J. C. Molony, 404 †
East India and Persia, New account of, 1672–1681: J. Fryer, 300 †
Empire of India: Sir B. Fuller, 189 †, 579 §
India and the Indians: E. F. Elwin, 601 †
Isostasy in India, Investigation of Theory of: H. L. Crosthwaite, 374 §
Lushei Kuki Clans: J. Shakespear, 580 §
Maps: Government Surveys, 414 †
Pioneers in India: Sir H. Johnston, 81 †, 581 §
Survey of India, Annual Reports, 1861–1870..90 †; Records of: vol. 1, 1909–10..154 §
Visit to India of King George and Queen Mary, Narrative of: Hon. J. Fortescue, 81 †, 580 §
Indian Ocean—
Cyclones of South Indian Ocean, 1911, 1912: C. W. Brebner, 87 †
Maps: Atlas der Meeresströmungen in dem Indischen Ozean (Kaiserliche Marine, Deutsche Seewarte), 418 †; Indische Ozean: M. Groll, 310 †; Meteorological Charts (Met. Office,

London), † 96, 199, 311, 418, 516, 612; Meteorological Charts (U.S. Weather Bureau), † 96, 199, 418, 612; Pilot Charts (U.S. Hydrog. Office), † 199, 311, 418, 612
Indo-China—
Jungles Moï: H. Maitre, 475 §
Ingram, G. S., Photographs of Himalayas, 200 †
Inkisi, La rivière, Reconnaissance de mission Robert Thys, 190 †
Inman, H. T., Rome, 272 §
Innsbruck—
Klima von Innsbruck mit besonderer Rücksicht auf den Föhn: A. Defant, 503 †
Invar Tape for Base-line measurement, 362
Irawadi—
Upper Irawadi, exploration of: J. Barnard and F. V. Clerk, 166
Ireland—
Handbook for Ireland, Murray's, 272 §
Inter-basaltic rocks of Ireland: G. A. Cole and others, 506 †
Map, Raised, of Ireland, Description of: G. A. Cole, 188 †
New Grange (Bragh Na Boinne): G. Coffey, 272 §
Irkutsk-Bodaybo Railway, Surveying operations of: V. Polovnikoff, 190 †
Irmel mountains, From the Salka works to: A. P. Chlerovski, 187 †
Isachsen, G., Astronomical and geodetical observations, 409 †; Exploration du Nord-Ouest du Spitsberg, 193 †, 482 §; Hydrographic observations of Isachsen Spitsbergen Expedition, 606 †; Observations astronomiques faites au Spitsberg par l'Expédition Isachsen, 1909–10, et calculées par A. Alexander, 304 †
Islam, Encyclopædia of: M. T. Houtsma and M. Seligsohn, 307 †
Isostasy: a rejoinder to article by Harmon Lewis: J. F. Hayford, 305 †
Issyk-kul—
Issyk mountain lake in Trans-Ilian Alatau: A. Vinokurof, 82 †
Italy—
"Æfula": contributo alla topografia ed alla storia dell' antico Lazio: L. Bucciarelli, 505 †
Carta manoscritta d'Italia nella Biblioteca Estense di Modena, A proposito di una: R. Almagià, 505 †
Climatologia d'Italia, Materiali per la: G. Anfossi, 599 †
Handbook for travellers: Northern Italy: K. Baedeker, 403 †
Italien als Mittelmeermacht: P. O. Fischer, 80 †
Journal du voyage de Michel de Montaigne en Italie, 91 †
Little Cities of Italy: A. Maurel, 599 †
Popolazione nel bacino del Noce (Adige)
Italy—*continued.*
Distribuzione altrimetrica della: L. Ricci, 504 †
Popolazione, Studi sopra distribuzione della: G. Dainelli, 80 †
Sedi umane nella Conca di Monterreale: G. Mussoni, 505 †
Sedi umane sulla costa fra Serchio e Magra, Osservazioni sopra le: V. Dvorsky, 504 †
Southern Italy and Sicily: K. Baedeker, 576 §
Travel Sketches, Italian: J Sully, 474 †
Wanderings on the Italian Riviera: F. Lees, 273 §
Itawa, chief and people of, 437
Ivory coast—
Fondation de Colonie Française de la Côte d'Ivoire: F. Bullock, 377 §

J.

Jack, E. M., Mufumbiro mountains, 532 *
Jaeger, F., Geographische Forschungen im abflusslosen Gebiet von Deutsch-Ostafrika, 509 †
Jalla, L., Il paese e le tribù dell' Alto Zambesi, 83 †
Jalwo Kavirondo natives, 116
Jamaica—
Geology of Jamaica, Reports on: J. G. Sawkins, 91 †
History of Jamaica case: W. F. Finlason, 90 †
Jan Mayen—
Photographs of Jan Mayen: J. B. Charcot, 311 †
Japan—
Fighting spirit of Japan, and other studies: E. J. Harrison, 189 †
Maps: Topographical Map (Imp. Geol. Survey of Japan), 414 †, 415 †
Jäschke, H. A., Tibetan-English dictionary, 90 †
Java—
Culture du thé à Java: C. Bernard, 404 †
Maps: Overzichtskaart van Java en Madoera (Top. Bureau Batavia), 609 †
Telegraph developments in, 489
Jensen, H. I., Building of Eastern Australia, 409 †; Nature and origin of Gilgai country, 288 §, 304 †
Jerablus, Asia Minor, 246
Jerphanion, G. de, Notes de géographie Pontique, 508 †
Jesperson, E., Nyopdagede Nordbo-Ruiner: Julianehaab-Distrikt, 605 †
Jijon y Caamaño, J., El Tesoro del Itschimbia, 192 †
Johansen, H., obituary, 175
Johns, C. H., Ancient Babylonia, 405 †
Johnson, A. T., California: An Englishman's impressions of Golden State, 604 †
Johnson, E. R., Panama Canal traffic and tolls, 304 †

Johnson, F. R., Bear Creek Hydrographic Survey, British Columbia, 303 †
Johnson, J. P., Prehistoric period in South Africa, 83 †
Johnson, P. H.: see Brown, W. C.
Johnston, Sir H. H., Chaillé-Long's "My Life in Four Continents," 484 §; History of Colonization of Africa by Alien races, 602 †; Livingstone and exploration of Central Africa, 89 †; Livingstone as an Explorer, 423 *; Pioneers in India, 81 †, 581 §; Railway projects in Africa and Near East, 306 †
Johnston, W. & A. K., Bathyorographical map of Forth and Tay, 413 †
Joly, A., Titteri, sa structure, son modelé, 508 †
Jones, O. T., Geological structure of Central Wales, 299 †
Joubin, L., Carte de bancs et récifs de coraux, 494 §, 606 †
Jousset, P., La France: géographie illustrée, 298 †
Joyce, W. St. J., Neighbourhood of Dublin, 371 §, 403 †
Jubaland and its inhabitants: F. Elliott, 554 *
Juba river, East Africa, 463

K.

Kaiser Wilhelm barrier, Antarctic, 172
Kaiserin Augusta river, German New Guinea, Expedition to, 390
Kalahari—
  Topography and geology of German South Kalahari: P. Range, 68 §, 302 †
Kalbinsk Ranges, On orography and geology of: V. A. Obrucheff, 600 †
Kallinikof, N. T., Our extreme North-East, 507 †
Kamchatka—
  Investigations in Kamchatka, 1908–09: V. L. Komarof, 82 †
  Two Years in Kamchatka: V. L. Komarof, 82 †
Kamerun—
  Expedition in Kamerun: F. Thorbecke, 167
  Maps: Karte von Kamerun: M. Moisel, 309 †; Regenmess-Stationen in Kamerun, 1911: M. Moisel, 309 †; Vegetationskarte der von dem Botaniker Ledermann durchreisten Gebiete Kameruns: M. Moisel, 308 †
  Neu-Kamerun: F. Hutter, 509 †
  Seenstudien in Nord-Kamerun: K. Hassert, 83 †
Kansas City, Missouri, Development of, 139
Kan-su—
  Bilder aus Kan-su: W. Filchner und H. Mueller, 189 †
Karakoram and Western Himalaya, 1909: F. de Filippi, 81 †, 156 §
Karisimbi, Mount, Mufumbiro range, 535
Karlik Tagh, Mongolia, 348; Notes on maps illustrating explorations in Barkul range and Karlik Tagh: D. W. Carruthers, 348
Kasai river, Livingstone's discovery of, 434
Katanga—
  Cartographique du Katanga, Rapport sur l'organisation d'un service: G. de Béthune, 508 †
Katmai volcano—
  Eruption of, 1912: G. A. Clark, 387 §, 604 †
  Report of eruption of: I. M. Dailey, 191 †
Kavirondo tribe, British East Africa, 117, 128
Kayan tribes of Sarawak, 577
Käyser, C. C., Verslag der Corantijn-Expeditie, 511 †
Keir, R. M., Fisheries: an example of attitude towards resources, 84 †
Kellas, A. M., letter on mountain sickness, 77
Kemp, J. F., Storm King Crossing of Hudson river, 84 †
Kendall, E., Wayfarer in China, 601 †
Kendu, Victoria Nyanza, 125
Kensington, W. C., New Zealand. Report on Scenery Preservation for 1909–10..86 †; Report on state afforestation in New Zealand for 1910–11..86 †
Keyes, C. R., Wind-graved Mesas and their message, 408 †
Keyte, J. C., Passing of the Dragon, 600 †
Kiær, A. N., Bevölkerungsstatistik der Länder ohne Volkszählung, 195 †
Kiær, H., On bottom deposits from second Norwegian Arctic Expedition in *Fram*, 88 †
Kiangsi, China, 566
Kibo—
  Kibo-Besteigung: M. Lange, 406 †
Kiepert, H., Ethnographische Uebersichtskarte des europäischen Orients, 307 †
Kiepert, R., Karte von Kleinasien, 93 †' 608 †
Kinematograph in school: H. C. Hale, 306 †
King, F. H., Farmers of Forty Centuries, 601 †; Wonderful canals of China, 507 †
King Edward's Land, Antarctic, 13
King Haakon plateau, Antarctic, 11
Kinthup, native explorer, Work of, 105, 106, 112, 292
Kirilloff, N. V., Alaska and its relation with Chukche peninsula, 603 †
Kirschstein, E. F., Ascents of Volcanoes in Nyasaland, 284
Kisii—
  From Victoria Nyanza to Kisii Highlands: F. Oswald, 114 *
Kisii Boma, British East Africa, 122
Kismayu district, Jubaland, 558

Kitson, A. E., Southern Nigeria; some considerations of its structure, etc., 16*
Kivu, Lake, Central Africa, 541, 548
Klebelsberg, R. v., Totes Gletschereis als Bestandteil der Moränenlandschaft, 411†
Klemantan tribes, Sarawak, 577
Klotz, O., Stereographische methode zur Herdbestimmung von Erdbeben, 194†
Knoche, W., Tres notas sobre la Isla de Pascua, 304†
Kober, L., Bericht über die geotektonischen Untersuchungen im östlichen Tauernfenster, 503†
Koch-Grünberg, T., Auf neuen wege in Nordbrasilien, 510†
Koebel, W. H., In Jesuit Land; the Jesuit missions of Paraguay, 304†
Kohlschutter, E., Ergebnisse der Ostafrikanischen Pendel-Expedition, 302†
Komarof, V. L., Investigations in Kamchatka, 1908–09..82†; Two Years in Kamchatka, 82†
Komsing, Cane bridge over river at, 100
Korea—
Modern pioneer in Korea: W. E. Griffis, 300†
Northern China and Korea: J. Madrolle, 580§
Photographs: J. F. Bishop, 418†
Koshanin, N., Resinous woods of Sharplanina and Korab, 187†
Krause, E., Pflanzenwanderungen längs der Ill, des Rheines und der Eisenbahn, 66§, 79†
Krebs, N., Bewohnten und unbewohnten Areale der Ost-Alpen, 65§, 401†; Verteilung der Kulturen und Volksdichte in österreichischen Alpen, 401†
Krebs, W., Älteste Angabe der magnetischen Missweisung über Europa, 513†; Neue Unternehmungen zur magnetischen Aufnahme der Erde, 411†
Kreutzbruck v. Lilienfels, O., Turkisch-serbische Kriegsschauplatz, 401†
Krischtafowitsch, N. J., Sur la dernière période glaciaire en Europe et dans l'Amérique du Nord, etc., 410†
Kriwoschein, A. W.: *see* Stolypin, P. A.
Krümmel, O., obituary, 72
Kuchinka, G., Nordalbanien, 506†
Küchler, K., Die Færöer. Studien und Wanderfahrten, 598†
Kuehn, A. F., Experience of mountain sickness, 295
Kuja river, British East Africa, 119
Kuntz, J., and W. Rux, Das Kaokofeld (Deutsch-Südwestafrika), 308†
Kurdistan—
Geographie von Kurdistan: Freiherrn v. Handel-Mazzetti, 82†, 165§
Kuznecov, N. J., Essai d'une division de Sibérie en provinces phyto-géographiques, 508†
Kwango—
Exploration oubliée; voyage de Jan de Herder au Kwango (1642): R. Avelot, 603†

L.

Labrador—
Current, Effect of, upon surface temperature of North Atlantic: M. W. C. Hepworth, 71§, 88†
Eskimos of Labrador, Among: S. K. Hutton, 378§
Expedition in South-Eastern Labrador: H. G. Bryant, 340*
Exploration in South-Eastern Labrador: H. G. Bryant, 303†
Northern Labrador, In: W. B. Cabot, 479§
Photographs of Eskimos in Labrador: S. K. Hutton, 312†
Lacroix, A., Voyage au pays des Béryls (Madagascar), 509†
Ladreit de Lacharrière, J., Ras el oued Sous, 83†
Lagos—
Maps: Plan of Town of Logos (Southern Nigeria Survey), 609†
Lahoutan, Ancient Lake of North America, 75
Lak Dera, Jubaland, 555
Lakes—
Berliner Seenstudien und Meeresforschung: A. Merz, 88†
Europaischen Seen, Topographie . . . der: W. Halbfass, 512†
Lalesque, F.: *see* Bergon, P.
Lallemand, C., Projet d'Organisation d'un Service International de l'Heure, 512†
Lambert, E.: *see* Morrow, F.
Lamotte, R. P., Voyage en montagne, 298†
Lamplugh, Mr., remarks on "An English Desert," 573
Land—
Land und Wasser auf der Erdoberfläche: H. Wagner, 88†
Landon, P., Tibet, China, and India, 403†
Lange, M., Eine Kibo-Besteigung, 406†
Langenbeck, W., England's Weltmacht in ihrer Entwicklung vom 17. Jahrhundert bis auf unsere Tage, 412†
Langholm as it was: J. and R. Hyslop, 154§
Languedoc, Provence and: C. Headlam, 153§
Lardner, E. G. D., Soldiering and sport in Uganda, 191†
Latitude—
Näherungsweise Bestimmung der Polhöhe in sehr hohen Breiten: K. Schoy, 410†
Lautensach, H., Uebertiefung des Tessingebietes, 80†
Lauteret pass, French Alps, Memorial tablet to Captain Scott, 486
La Vérendryes' visit to Upper Missouri, Record of, 588

Lavoix, J., Sur les Confins Marocains, 406 †
Law, M. C., Story of Bradford, 599 †
Lawson, A. C., Recent fault scarps at Genoa, Nevada, 287 §, 510 †
Leachman, G. E., Journey across Arabia, 147
Leaf, W., Troy, a Study in Homeric Geography, 371 §
Leary, L. G., Andorra, Hidden Republic, 576 §
Leca, P., La Corse, Collection des Guides-Joanne, 504 †
Leclerq, J., Aux sources du Nil par Chemin de Fer de l'Ouganda, 83 †
Ledermann, —: *see* Moisel, M.
Lee, I., Commodore Sir J. Hayes, his voyage and life, 195 †
Lee, Sir S., Dictionary of National Biography, 195 †
Lees, F., Wanderings on Italian Riviera, 273 §
Laffitte, L., Evolution économique de la Lorraine, 504 †
Legendre, A. F., Exploration dans Chine occidentale et les marches tibétaines, 384 §, 600 †
Legrand, R., Fouladou, 509 †
Leitch, D. C., Water-supply of Witwatersrand, 407 †
Lemaree, Y., Port de Caen et mines de fer de Basse-Normandie, 79 †
Lemoine, P., Géologie du fond des mers, 512 †
Lempfert, R. G., Weather science, 194 †
Lenz, Oskar, Publikationen von, 195 †
Lepsius, Richard, über die Einheit und die Ursachen der diluvialen Eiszeit in den Alpen: A. Penck, 400 †
Leroy-Beaulieu, P., Chemins de fer transsahariens et transafricains, 405 †
Le Roy, O. E., Geology and deposits of Phœnix boundary district, British Columbia, 407 †
Le Strange, G., Description of province of Fars, at beginning of twelfth Century, 404 †
Le Testu, Guillaume, Un pilote et cartographie Havrais au XVI^e^ siècle: A. Anthiaume, 412 †
Levainville, J., Transformations du port du Havre, 504 †
Levels—
Precise Level of U.S. Coast and Geodetic Survey, 255
Watt's Portable Level, 256
Zeiss Level, 253
Lewis, H., Isostacy, a rejoinder to article by: J. F. Hayford, 305 †
Leyst, E., Luftdruck und Sonnenflecken, 305 †
Lhasa—
Notes on Lhasa—Mecca of Buddhist Faith: S. H. Chuan, 507 †
Liberia—
Maps: Western Liberia: H. Schomburgk, 93 †
Liberia—*continued*.
Political psychology of West Africa, Liberia in: G. W. Ellis, 406 †
Libyan Desert—
Bibliografia della Libia: F. Minutilli, 91 †
History of Eastern Libyans: O. Bates, 508 †
Journey in Libyan Desert: G. Sykes, 602 †
Three years in Libyan desert: J. C. E. Falls, 406 †
Wayfarers in Libyan desert: Lady E. Cobbold, 190 †, 478 §
Lichtenberger, H., Evolution of modern Germany, 599 †
Life in Four Continents, My: C. Chaillé-Long, 484 §
Liffey—
Problem of Liffey Valley: G. A. Cole, 188 †
Light Penetration in Sea Water: K. Grein, 290
Liguria—
Popolazione nella riviera ligure, Distribuzione della: G. Aicardi, 80 †
Li-Kiang—
Documents historiques et géographiques relatifs à Li-Kiang: E. Chavannes, 507 †
Likoma island, Lake Nyasa, Cathedral Church on, 448
Lim valley, Sanjak of Novibazar, 471
Lima—
Comunicación radiográfica directa entre Lima é Iquitos: A. E. Tamayo, 605 †
Linde, R., Niederelbe, 599 †
Lindgren, W.: *see* Hill, J M.
Lindsay, F., Panama and the Canal to-day, 60 §
Linlithgow—
Cambridge County Geographies, Linlithgowshire: T. S. Muir, 188 †
Linth—
Linthwerk und seine Schöpfer: F. Becker, 187 †
Livingstone, D.—
Centenary Celebrations of Livingstone College, 393
David Livingstone, Centenary of his birth. Introductory Remarks by Lord Curzon, 421 *
Livingstone and exploration of Central Africa: Sir H. Johnston, 89 †
Livingstone as an Explorer: Sir H. H. Johnston, 423 *
Memorials of David Livingstone. Souvenir of Livingstone Centenary. Issued by Livingstone College, 412 †
Lizard and Meneage, Geology of: J. S. Flett and J. B. Hill, 506 †
Lloyd, R., and others, Twentieth Century Impressions of Brazil, 510 †
Lóczy, L. V., Artesischen Brunnen des grossen ungarischen Alföld, 80 †; Ueber die Gaseruption bei Kissármás,

505 †; Ueber die Petroleumgebiete Rumäniens, 505 †
Lombardy—
Antica carta stampata della Lombardia: R. Almagià, 505 †
Cities of Lombardy: E. Hutton, 154 §
London—
Maps: Bacon's Large Scale Atlas of London and Suburbs: W. Stanford, 308 †; Proposed Railways, Tramways, etc.: E. Stanford, 413 †; Railways of London and Suburbs: Cook and Hammond, 413 †
Roman London: F. Haverfield, 299 †
Visit to London in year 1651: C. E. Stewart, 299 †
Long Row and Wasses, Arthur's Seat, Some observations on: T. C. Day, 506 †
Long valley, Aldershot, 569
Longitudes—
Determination of Longitudes by Wireless Telegraphy, 249, 368
Détermination des longitudes en campagne par télégraphie sans fil: Tilho et Troadec, 305 †
Longnon, J.: *see* Fossey, J.
Longstaff, T. G., Mr. Collins' Triangulation of Teram Kangri, 300 †
Lorenzi, A., Il Cielo, la Terra e l'Uomo nelle opere filosofiche di M. Tullio Cicerone, 513 †
Lorian swamp: C. W. Haywood, 463 *
Lorié, J., Het Verzonken gat te Hillegom, 504 †
Lorraine—
Evolution économique de la Lorraine: L. Laffitte, 504 †
Lothian—
Geographical description of East Lothian: C. M. Ewing, 506 †
Love, A. E., Tides and rigidity of Earth, 513 †
Lowery, W., and P. L. Phillips, Descriptive list of maps of Spanish Possessions within present limits of United States, 1502–1820..510 †
Löwy, E., Orometrie der Fatra-Kriván, 401 †
Löwy, H., Fizeausche Methode zur Erforschung des Erdinnern, 88 †
Lucas, A., Natural Soda Deposits in Egypt, 406 †
Lucas, Sir C. P., Greater Rome and Greater Britain, 411 †
Lucas, E. V., Wanderer in Florence, 154 §
Lucca: J. Ross and N. Erichsen, 575 §
Lukach, H. C., and D. J. Jardine, Handbook of Cyprus, 599 †
Lukuga—
Exploration de rivière Lukuga: J. Schwetz, 602 †
Lumholtz, C., Exploration in Dutch New Guinea, 170 †; New trails in Mexico, 84 †
Lunar attraction—
Déformations de la terre sous l'influence de l'attraction de la lune, Observations sur: A. J. Orlov, 410 †
Lunn, A., Englishman in the Alps, 298 †, 475 §
Lunzer Seen, Die Kartierung der: G. Götzinger, 503 †
Lurnfeld, Das: E. Stummer, 401 †
Lushei Kuki Clans: J. Shakespear, 580 §
Lutz, C. W., Johann Baptist Messerschmitt, 412 †
Luxemburg—
Maps: Carte topographique du Grand Duché de Luxembourg: J. Hansen, 307 †
Lyde, L. W., l'Homme Blanc Tropical, 514 †
Lyne, R. N., Mozambique: its agricultural development, 603 †
Lynx lake, Labrador, 246
Lyons, H. G., remarks on: "Notes on Moroccan Geography," 238; "Some new and improved Instruments for Geographical Surveying," 369

M.

Macarthur, John: J. D. Rogers, 195 †
McCaw, W. J., and others, Diary of Caledon Bay prospecting party, 169 §, 193 †
McCormick, F., China's treasures, 507 †
M'Donald, A. B., County of City of Glasgow as divided into Municipal Wards, 307 †
Macdougal, D. T., Some physical and biological features of North American Deserts, 303 †
McDougall, W.: *see* Hose, C.
Macedonia—
Historical Geography, 332
McGilvary, D., A half-century among Siamese and Lão, 301 †
Macgowan, J., How England saved China, 600 †
Machaček, F., Klima von Turkestan, 66 §, 405 †; Ueber einige Ergebnisse neuerer geografischer Forschung im Tian-schan, 405 †; Westlichste Tienschan, 600 †
Machu Pichu ruins, Peru, 390
Mackenzie, D., Journey through nine Moorish Provinces, 406 †
Mackenzie, J., New Zealand. Report on Survey Operations for 1911–12..409 †
Mackenzie river—
Down Mackenzie and up Yukon in 1906: E. Stewart, 407 †
Mackenzie river, Canada, 452
Mackinder, H. J., Strategical geography of Near East, 412 †
Macleod, O., Chiefs and Cities of Central Africa, 57 §
Macmillan, D. B., Expedition to Crocker Land, 593
McQueen, Mr., Prospecting from Victoria Nyanza to Lake Mweru, 602 †

Madagascar—
Voyage au pays des Béryls; A. Lacroix, 509 †
Maddox, H. E., Note on name Mufumbiro, 547
Madras—
Census of India, 1911. Madras Report: J. C. Molony and A. Chatterton, 404 †
Madrolle, J., Northern China and Korea, 580 §
Madrolle's Guide Books. Northern China: Valley of Blue River, 300 †
Magellan, Straits of, Discovery of, 524
Magnetic declinations and chart corrections in Atlantic Ocean; L. A. Bauer and W. J. Peters, 513 †; Magnetic declinations and chart corrections obtained by *Carnegie* from Batavia to Manilla, etc.: L. A. Bauer and W. J. Peters, 513 †
Magnetism—
Neue Unternehmungen zur magnetischen Aufnahme der Erde: W. Krebs, 411 †
Magrini, G., Distribuzione delle pioggie nella Regione Veneta durante gli anni 1909–10..505 †
Maine—
Water resources of Penobscot River Basin: H. K. Barrows and C. C. Babb, 85 †
Maitre, H., Jungles Moï, 475 §
Malay Archipelago—
Atollen en barrière-riffen in de Oost-Indiese archipel: J. F. Niermeyer, 300 †
Onderzoek van den Rindjani en zejne omgeving: J. C. van Eerde, 300 †
Sunda-Expedition des Vereins für Geographie und Statistik zu Frankfurt am Main: J. Elbert, 190 †
Malay Peninsula—
Malay Peninsula: A. Wright and T. H. Reid, 81 †
Mali Ka, Irawadi, 166
Mallett, J., Railway development in Canada, 604 †
Malthus and some recent census returns: G. G. Chisholm, 513 †
Man—
Homme Blanc Tropical: L. W. Lyde, 514 †
Manchuria—
Volcanic province Uyun Kholdon in North Manchuria: J. K. Vislukh, 160 †
Manga Escarpment, British East Africa, 123
Manila—
Flora of Manila, Notes on: E. D. Merrill, 404 †
Manuelli, A., Sul rapporto solfati-cloruri nell' acqua di mare, 512 †
Manyuema forest and country, Central Africa, 436 *note*, 439
Map projections: A. R. Hinks, 278 §
Map-reading Cards. Philips' Practical: H. H. Goodacre, 95 †
Maps—
Genoese World-Map, 1457: E. L. Stevenson, 62 §
International Map of World on Millionth Scale, Progress of United States map, 388
International one-in-a-million map of World: A. R. Hinks, 606 †
Mappemonde de Théodulfe et mappemonde de Ripoll: A. Vidier, 514 †
Portulan du XV^e^ siècle découvert à Gap: C. de la Roncière, 411 †
Portulan de la Mediterranée et d'une partie de l'Atlantique, Note sur: P. Guillaume, 411 †
Maps, New—
Africa, 93, 196, 308, 415, 514, 609
America, 94, 197, 309, 415, 515, 610
Asia, 93, 414, 608
Australasia and Pacific Islands, 197, 310
Europe, 92, 196, 307, 413, 514, 608
General, 95, 197, 310, 416, 515, 610
Marees, P. de, Beschryvinghe ende historische verhael van het Gout Koninchrijck van Gunea, etc., 302 †
Marek, R., Geographische Ergebnisse der Volkszählung in Oesterreich, 487 §, 598 †
Marianne islands—
Bilder aus den Karolinen und Marianen: Schnee, 409 †
Mariout District, Report on: A. L. Weedon, 508 †
Maritza river, Rumelia, 334
Markham, Sir C. R. (*see also* Church, G. E.), Conquest of New Granada, 85 †; Nomenclature of Newlands, 398; obituary of R. F. Scott, 217; Putumayu and question of Boundaries between Peru and Colombia, 145 *; Vasco Nuñez de Balboa, 1513–1913..517 *
Marks, E. O., Notes on geological age of volcanic activity in South-East Queensland, 409 †
Marks, J., Gallant little Wales, 403 †
Marlborough's travellers' practical manual of conversation, 307 †
Marriott, W., Results of hourly wind and rainfall records at Southport, 506 †
Marshall, P., Geology of New Zealand, 86 †
Martel, E.-A., Cañon du Rhône, 79 †
Martelli, A., Pesca e l'industria della spugne nelle Sporadi meridionali, 597 †; Ricerche geologiche e geografico-fisiche nelle Sporadi meridionali, 503 †
Martin, L.: *see* Tarr, R. S.
Martin, P. F., Greece of the Twentieth Century, 186 †
Martinière, P. M. de la, Nouveau voyage vers le septentrion, 90 †
Martino, G. de, Somalia Italiana nei tre anni del mio governo, 302 †, 581 §
Martonne, E. de, Etude morphologique

des Alpes Orientales et Karpates Septentrionales, 401 †
Maryland—
Geological Survey. Prince George's County, 85 †
Iron ores of Maryland, Reports on: J. T. Singewald, 85 †
Mascart, J., Impressions et observations dans un voyage à Tenerife, 405 †
Masey, F. E., Zimbabwe; An architect's notes, 603 †
Maurel, A., Little Cities of Italy, 599 †
Mawson, D., Antarctic Expedition, 355, 595; Losses to, 228
Mayer, J., Der Mürzgau, 504 †
Mecca—
Geographical latitude and longitude of Mecca and Jidda, Determination of: N. Scheltema, 189 †
Modern Pilgrim in Mecca and a siege in Sana'a: A. J. Wavell, 273 §
Pilgrimage to Mecca: Nawab Sikandar Begum of Bhopal, 90 †
Mecklenburg, Duke of, Vom Kongo zum Niger und Nil, 302 †; Meine Inner-Afrika-Expedition, 1910–11 . . 405 †
Mediterranean—
Portulan de la Mediterranée, etc.; Note sur un: P. Guillaume, 411 †
Voyage to Cadiz and Gibraltar, etc.: J. Cockburn, 90 †
Meinhard, F., Thrakien und dem südbulgarischen Rhodopegebirge, 401 †
Mekong-Yangtse Divide, 587
Meleto or Maratokh Dagh, 165
Melland, F. H., letter on review of 'Through Heart of Africa,' 77
Meneage, Geology of Lizard and: J. S. Flett and J. B. Hill, 506 †
Mercator, G., Atlas, sive cosmographicæ meditationes de fabrica mundi et fabricate figura, 90 †
Merkulof, V. A., Routes in Western Caucasus, 404 †
Merrill, E. D., Notes on flora of Manila, 404 †
Merz, A., Berliner Seenstudien und Meeresforschung, 88 †; Schottische Seenforschung, 506 †
Merz, D., Death of, in Antarctic, 230
Mesa—
Wind-graved Mesas and their message: C. R. Keyes, 108 †
Mesa Verde, Geographic study of: W. W. Atwood, 84 †
Meseta, coastal plain, Morocco, 232
Mesopotamia—
Osten Mesopotamiens, In: E. Banse, 405 †, 508 †
Messerschmitt, J. B. (biography): C. W. Lutz, 412 †
Meteorology—
Aerologie tropischer und subtropischer Ozeane: A. Peppler, 88 †
Atmosphere: A. J. Berry, 410 †
Atmosphere in Clear Weather, Structure of: C. J. Cave, 60 §
Meteorology—*continued*,
Atmospheric electrical potential with altitude, On variation in value of: W. A. Rudge, 512 †
British Meteorological and Magnetic Year-Book, Part III. (Meteorological Office), 305 †
Elementary meteorology: W. M. Davis, 90 †
Energieumwandlungen in der Atmosphäre: J. W. Sandström, 88 †
Free atmosphere in region of British Isles: W. H. Dines and W. N. Shaw, 188 †
Geophysical Memoirs. Meteorological Office, 88 †
Hydrographical and meteorological phenomena, Connection between: O. Petterson, 88 †
Luftdruck und Sonnenflecken: E. Leyst, 305 †
Nouvelle méthode de prévision du temps: G. Guilbert, 305 †
Radiation records obtained in 1911 at South Kensington, etc.: R. Corless, 188 †
Rainfall in Tropical Areas: F. White, 512 †
Tabellarische Reisebericht nach den meteorologischen Schiffstagebüchern. Deutsche Seewarte, 88 †
Temperature, Some causes and effects of variation in range of: J. R. and E. Sutton, 88 †
Veränderungen in der allgemeinen Zirkulation der Atmosphäre in den gemassigten Breiten der Erde A. Defant, 411 †
Weather science: R. G. Lempfert, 194 †
Mettrier, H., Mont Blanc vu de Dijon au XVI^e^ siècle, 400 †
Meuse—
Ancienne embouchure de la Meuse près de Bonn: H. Pohlig, 402 †
Mexico—
Civilization of Ancient Mexico: L. Spence, 59 §, 84 †
Climatic Changes in Mexico: E. Huntington, 588
Colima Volcano, Eruption of, 390
Conquest of New Spain, True history of: P. Diaz del Castillo, 191 †
Historic manuscript of Mexico, Discovery of: C. W. Currier, 510 †
Maps: Carta General del Estado de México y del Distrito Federal: Don L. G. Becerril, 416 †
New trails in Mexico: C. Lumholtz, 84 †
Plantas desertícas mexicanas, Memoria sobre: I. Ochoterena, 510 †
Meyer, E., En obeaktad svensk reseskildrare på 1600-talet, 607 †
Meyers historischer Handatlas, 611 †
Michel, R., Bilder und Skizzen aus Bosnien und Hercegovina, 298 †
Michelin, —, Carte, France en 47 Feuilles, 414 †

Michoacán—
Estado de Michoacán, Notas geológicas sobre la région norte del: G. de J. Caballero, 510 †
Pico de Tancitaro, Michoacán: E. Ordoñez, 510 †
Micmac Indians of Nova Scotia and their remains, Brief account of: H. Piers, 509 †
Middlesex—
Cambridge County Geographies. Middlesex: G. F. Bosworth, 299 †
Migeod, F. W. H., Languages of West Africa, 407 †, 603 †
Mikeno mountain, Mufumbiro Range, 535
Mikkelsen, E., Expedition to North-East Greenland, 1909–12..313 *; Lost in the Arctic, 304 †, 481 §
Miles, E. A., Spell of the Rockies, 59 §
Mill, H. R. (*see also* Whitaker, W.), Amundsen's 'South Pole'; a Review, 148; On distribution of rain . . . over British Isles in 1911..188 †
Milligan, J. W.: *see* Ward, H. F.
Millington, P., On track of the Abor, 189 †, 476 §
Milne, John (biography), 306 †
Minas Geraes—
Maps: Mappa do Estado de Minas Geraes: B. J. dos Santos, 94 †
Minutilli, F., Bibliografia della Libia, 91 †
Mishmi and Miri Expeditions, 275
Mississippi—
Evolution of, 46
Flood of 1912: R. M. Brown, 408 †
Indian tribes of Upper Mississippi Valley, etc.: E. H. Blair and others, 84 †
Water-power on Mississippi, utilization of, 389
Missouri—
Geographical Interpretation of Missouri: F. V. Emerson, 39 *, 130 *
La Vérendryes' Visit to Upper Missouri, Record of, 588
Prairies of Missouri, 44
Mitchell, F. W., remarks on Election of Women as Fellows, 185
Mitchell, H. C., Triangulation along east coast of Florida, 192 †
Modat, —, Journey on Nile-Congo-Shari Watershed, 166
Mo Erh Shan, North China, 276
Moffit, F. H., Headwater regions of Gulkana and Susitna rivers, Alaska, 191 †
Mohammedan peoples—
Encyclopædia of Islam: M. T. Houtsma and M. Seligsohn, 307 †
Mohn, H., Meteorology (of Second Norwegian Arctic Expedition), 409 †
Moï—
Jungles Moï: H. Maitre, 475 §
Moisel, M. (*see also* Sprigade, P.), Karte von Kamerun, 309 †; Regenmesz-Stationen in Kamerun 1911..309 †; Südostecke von Kaiser Wilhelmsland, 310 †; Vegetationskarte der von dem Botaniker Ledermann durchreisten Gebiete Kameruns, 308 †
Molony, J. C., Census of India, 1911, vol. 11, Coorg Report and tables, 404 †; vol. 12, Madras, 404 †
Mongolia—
Exploration in Mongolia and Dzungaria, Notes on Maps illustrating: D. W. Carruthers, 346 *
Map of North-Western Mongolia, Explanation of: B. Vladimirtzoff, 601 †
Mongolia; Report on a journey May to July, 1911: R. B. Otter-Barry, 81 †
Nordwest-Mongolie: J. G. Granö, 404 †
Si-Wan-Ze (Mongolie): R. Verbrugge, 404 †
Montagnais Indians, Labrador, 342
Montaigne, M. de, Journal du voyage en Italie, 91 †
Montandon, G., Traversée du massif éthiopien du désert Somali à la plaine du Soudan, 405 †
Monti, V., Secondo saggio di nuove ricerche sui ghiacciai del G. Paradiso, 503 †
Montreal—
De Montréal au Détroit en 1603: B. Sulte, 303 †
Mordziol, C., Rheinlande in naturwissenschaftlich-geographischen Einzeldarstellungen, 402 †
Morgan, B. H., Trade and Industrial Map of World on Mercator's Projection, 515 †
Mornet, J., Chemin de fer de l'Océan à Brazzaville, 509 †; Mission d'étude du chemin de fer de l'Océan à Brazzaville, 283 §, 509 †
Morocco—
Boundary Agreement, Franco-Spanish, 168, 236
Carte du Maroc occidental au 1:200,000, Etablissement d'une: M. Bassot, 83 †
Confins Marocains, Sur les: J. Lavoix, 406 †
Délimitation franco-espagnole au Maroc et ses conséquences: — Armatte, 509 †
Geography, Moroccan, Notes on: A. G. Ogilvie, 230 *
Géologie du Maroc: L. Gentil, 406 †
Journey through nine Moorish Provinces: D. Mackenzie, 406 †
Kartographie Nordmarokkos: P. Schnell, 83 †
Maroc: A. Bernard, 83 †
Maroc physique: L. Gentil, 157 §
Ras el oued Sous: J. Ladreit de Lacharrière, 83 †
Spanish sphere in Morocco, 237
Transports maritimes sur la côte du Maroc et le port d'Aïyr: Gen. de Torcy, 83 †
Morrey, W. T.: *see* Arey, A. L.
Morrow, F., and E. Lambert, Practical and experimental geography, 607 †
Mougin, M., Savoie. Programme pour l'étude d'un grand glacier, 401 †
Moule, A. C., T'ai Shan, 507 †

Mountain sickness—
Letters from: W. B. Douglas, 399; A. M. Kellas, 77; J. W. Redway, 176; W. H. Shockley, 76, 295; J. G. Steese, 177; H. S. Toppin, 399
Moura, A., Mappa do Sul do Brazil, 94 †
Mozambique—
Agricultural development: R. N. Lyne, 603 †
Geology of Mozambique, Outlines of: A. Holmes and W. A. Wray, 302 †
Mueller, H.: *see* Filchner, W.
Mufumbiro Mountains: E. M. Jack, 532 *
Muhavura Mountain, Mufumbiro range, 535
Muir, T. S., Cambridge County Geographies. Linlithgowshire, 188 †
Mulert, F. E., Eerste uit Nederland naar Suriname gezonden landmeters, 511 †
Munk, Jens, Observations de, dans la baie d'Hudson en 1619 et 1620: B. Rolf, 513 †
Muret, E.: *see* Rabot, C.
Murray, G. W., Hamada Country, 602 †
Murray, John, remarks on "David Livingstone," 447
Murray, J. H., Papua, or British New Guinea, 86 †
Murray's Handbook for Ireland, 272 §
Murut tribes, Sarawak, 577
Mushketof, I. V., Collected works of. Part 2. Travels in Alai and Pamir, 600 †
Mussoni, G., Sedi umane nella Conca di Monterreale, 505 †
Mutanda lake, Central Africa, 540
Muzet, A., Aux pays balkaniques, 298 †
Myres, J. L.: *see* Freire-Marreco, B.

N.

Naegler, W.,
Erdbodentemperatur in ihren Beziehungen zur Entwicklung der Vegetation, 513 †
Nafe, O., Bau und Bild des Landeshuter Kammes und seines Vorlandes, 504 †
Namlagira mountain, Mufumbiro range, 535
Nansen, F. (*see also* Helland-Hansen, B.), Bodenwasser und Abkühlung des Meeres, 194 †
Napjus, J. van H. M.: *see* Van Hecht, J.
Naskapi Indians, Labrador, 480
Natal—
Vegetation of Natal: J. W. Bews, 69
Nathorst, A. G., Oberdevonische Flora des Ellesmere-Landes, 409 †
National Biography, Dictionary of: Sir S. Lee, 195 †
Nautical Almanac: J. R. Brown and H. B. Goodwin, 305 †
Nautical Astronomy: W. P. Symonds, 87 †
Navigation—
Association of Navigation Congresses, Permanent International, Bibliographic Notes: J. Pradelle, 607 †
New Navigation: F. C. Cross, 483 §
Navigation—*continued.*
Speed and current chronographer: A. G. Noble, 410 †
Tables of allowance for current when affecting compass course and ship's speed: G. E. Hoar, 193 †
Neale, W. H., obituary of B. L. Smith, 396
Neave, E. R.: *see* Nevill, H. R.
Neckel, G., Erste Entdeckung Amerikas im Jahre 1000 n. chr., 604 †
Nellas, D. H., Exploration and Survey of 141st Meridian, Alaska, 48 *
Nem Singh, Survey work on Upper Dihong district, 291
Nepal—
Picturesque Nepal: P. Brown, 300 †, 579 †
Nevada—
Fault scarps at Genoa, Nevada, Recent: A. C. Lawson, 287 §, 510 †
Midwinter trip through Nevada's Mountain Park: J. E. Church, 408 †
Nevill, H. R., and others, District Gazetteers of United Provinces of Agra and Oudh, 81 †
Newar tribe, Nepal, 579
Newbigin, M. I., An Introduction to Physical Geography, 161 §; Ordnance Survey Maps, their meaning and use, 298 †
New England—
Forestry in New England: R. C. Hawley and A. F. Hawes, 85 †
Former Glaciation in: J. W. Goldthwait, 490
Newfoundland—
Trans-Atlantic Route, Proposed, 172
New Granada, Conquest of: Sir C. Markham, 85 †
New Grange (Bragh na Boinne): G. Coffey, 272 §
New Guinea—
British: *see* Papua
Dutch—
Carstensz, Mount, ascent by A. F. R. Wollaston, 391
Expedition under A. F. R. Wollaston, 492
Exploratie van Nieuw-Guinea, 511 †
Exploration by Carl Lumholtz, 170
Exploration of Central Range of New Guinea: F. F. van der Ven, 591
Idenburg rivier in Nieuw-Guinea, Verkenning der: J. T. de Wal, 86 †
Land of New Guinea pygmies: C. G. Rawling, 409 †
German—
Beiträge zur Völker- und Sprachenkunde von Deutsch Neuguinea: G. Friederici, 86 †
Entdeckungsgeschichte von Neu-Guinea, 1885 bis 1902: A. Wichmann, 193 †
Finschhafen nach dem Markhamfluss, Eine Reise von: G. Pilhofer, 86 †

New Guinea—*continued.*
German—*continued.*
Kaiserin Augusta river Expedition under Herr Stollé, 170, 390
Maps: Südostecke von Kaiser-Wilhelmsland: M. Moisel, 310 †
New Madrid Earthquake: M. L. Fuller, 85 †
New Mecklenburg—
Maps: Sprachenkarte von Neu-Mecklenburg u.d. Nachbargebieten: G Friederici, 310 †
New South Greenland, Antarctic, 357
New South Wales—
Antimony-mining industry . . . in New South Wales: J. E. Carne, 304 †
Coal Resources of New South Wales: E. F. Pittman, 86 †, 287 §
Gilgai Country, Nature and origin of: H. I. Jensen, 288 §, 304 †
Narrative of a voyage of discovery . . . to New South Wales: J. Grant, 90 †
New Spain: *see* Mexico
New Zealand—
Geology of New Zealand: P. Marshall, 86 †
Lands and Survey, Dept. of, Report on Survey Operations for 1911–12: J. Mackenzie, 403 †; Report for 1911–12: J. Strauchon, 409 †
Raised beaches of Cape Turakirae: B. C. Aston, 86 †
Scenery Preservation, Reports for 1909–12: W. C. Kensington and J. Strauchon, 86 †
State afforestation in New Zealand, Report for 1910–11: W. C. Kensington, 86 †
Tararua Ranges, Discovery and extent of former glaciation in: G. L. Adkin, 86 †
Waipara gorge, Lower, Preliminary account of: R. Speight, 87 †
Ngamiland—
Photographs: A. G. Stigand, 200 †
Nieger, —, Mission d'études du chemin de fer transafricain, 602 †; Saharan Railway Expedition, 386
Niermeyer, J. F., Atollen en barrièreriffen in de Oost-Indiese archipel, 300 †
Nigeria—
Anthropological report on Ibo-speaking peoples of Nigeria: N. W. Thomas, 602 †
Nigeria and its Tin Fields: A. F. Calvert, 158 §
Shadow of the Bush, In: P. A. Talbot, 83 †, 477 §
Southern—
Handbook of Southern Nigeria Survey: F. G. Guggisberg, 56 §
Maps: Southern Nigeria: F. G. Guggisberg, 197 †
Report on results of mineral survey, 1910: W. B. Dunstan, 302 †
Some considerations of its structure, etc.: A. E. Kitson, 16 *
Nigeria—*continued.*
Southern—*continued.*
Tailed Head Hunters of Nigeria: A. J. N. Tremearne, 582 §
Nikolić, R. T., Glaciation du Sarplanina et du Korab, 79 †
Nile—
Christian Antiquities in Nile Valley: S. Clarke, 83 †, 377 §
Delta in Middle Ages: A. R. Guest, 301 †
Sources of Nile, 540
Verdunstung auf dem Nil bei Khartum: T. Türstig, 406 †
Nile-Congo-Shari watershed, Captain Modat's journey on, 166
Niles, G. G., Hoosac valley: its legends and its history, 303 †
Nima Gongo mountain, Mufumbiro range, 535
Ning-Yuan Fu, Western China, 384
Nimnis, B. E. S., Death of, in Antarctic, 228, 230
Njua, Mount, Kamerun, 167
Nmai Ka, Irawadi, 166
Noble, A. G., Speed and current chronographer, 410 †
Noe, F., Viaggio da Venetia al Santo Sepolcro et al Monte Sinai, 91 †
Noiret, —, Exploration in Western China, 384
Nomenclature of New Lands, letter from Sir C. Markham on, 398
Nordenskiöld, E., Ett bidrag till kännedom om Amerikas antropogeografi, 604 †
Nordenskjöld, O., Wissenschaftliche Ergebnisse der Schwedischen Südpolar-Expedition, 1901–1903..193 †
Nordlind, A., Geographische Entwicklung des Rheindeltas bis um das Jahr 1500..80 †
Norfolk—
Rainfall in Norfolk, Unprecedented, 188 †
Normandy—
Haute Normandie: J. Fossey and J. Longnon, 298 †, 474 §
Port de Caen et mines de fer de Basse-Normandie: Y. Lemaree, 79 †
Norway—
Fjords, Norwegian, Physical history of: E. Hull, 599 †
Forandringer ved norske bræer i aaret 1910–11: J. Rekstad, 505 †
Geodætiske Arbeider, 599 †
Maps: Kystkarter (Norges Geog. Opmaaling), 418 †
Voyage en montagne: R. P. Lamotte, 298 †
Norwegian Self-taught: C. A. Thimm and P. T. Haussen, 298 †
Norwegian South Polar Expedition: R. Amundsen, 1 *
Nova Scotia—
Geology of Arisaig-Antigonish district: M. Y. Williams, 303 †

Nova Scotia—*continued.*
Micmac Indians of Nova Scotia and their remains, Brief account of: H. Piers, 509 †
Novaya Zemlya—
Copper and Cupriferous ores in Island of Novaya Zemlia, District of, 606 †
Novibazar, Sanjak of: G. Gravier, 468 *
Nuttall, Mrs., remarks on "Vasco Nuñez de Balboa, 1513–1913," 528
Nyasa, Lake—
Discovery by Livingstone, 431
Nyasaland—
Ascents of Volcanoes in Nyasaland by E. F. Kirschstein, 284
Development of, 446
Slave-trading in Livingstone's time, 426

O.

Oates, L. E. G., obituary, 394
Oberlinus, J. J., Jugendorum marium fluviorumque omnis ævi molimina, 91 †
Obrucheff, V. A., On orography and geology of Kalbinsk ranges, 600 †; and others, Frontiers of Jungaria, 189 †
Ocean basins—
Kritischer Böschungswinkel und Kritische Tiefe: A. Böhm, 194 †
Oceania—
Adventures among South Sea Cannibals: D. Rannie, 159 §
Oceanography—
Bildungsverhältnisse der ozeanischen Salzablagerungen: J. H. van't Hoff, 305 †
Bodenwasser und die Abkühlung des Meeres: F. Nansen, 194 †
Elektrische Lampe zum Anlocken positiv phototaktischer Seetiere: K. Grein, 512 †
Geographie des Atlantischen Ozeans: G. Schott, 88 †, 279 §
Géologie du fond des mers: P. Lemoine, 512 †
Isachsen Spitsbergen expedition in 1910, Oceanographic observations of: B. Helland-Hansen and F. Nansen, 512 †
Photographische Lichtmessungen im Meer, Vorläufige Mitteilung über: R. Grein, 290 §, 512 †
Rock specimens dredged by *Michael Sars*, H.M.S.'s *Triton* and *Knight Errant*, Report on: B. N. Peach, 194 †
Solfati-cloruri nell' acqua di mare, Sull rapporto: A. Manuelli, 512 †
Sub-Oceanic Physiography of North Atlantic Ocean: E. Hull, 279 §
Termometro a rovesciamento Richter e tavole per la sua correzione: G. Feruglio, 512 †
Ochoterena, I., Memoria sobre le plantas desertícas mexicanas, 510 †
Oeniandus or Epiphanea ruins, 244
Oestreich, K., Ein glaziales Stauchungsprofil bei Arnheim, 504 †; Theobald Fischer, 195 †
Ogaden Somali, 556, 560
Ogilvie, A. G., An English Desert, 569 *; Notes on Moroccan Geography, 230 *
Ogilvie, W., obituary, 74
Ogowe river, Site for river port on, 387
Ohio—
Journey to Ohio in 1810 as recorded in Journal of Margaret van Horn Dwight: M. Farrand, 192 †
Ohio river, Evolution of, 46
Old Crow river, Alaska, 50, 54
Ollone, H. d', Langues des peuples non chinois de la Chine, 507 †
Ontario—
Maps: Province of Ontario (Dept. of Agriculture), 610 †
Oosterbeek, W. F. G., De voorgenomen uitbreiding en verbetering van het Nederlandsch-Indische telegraafnet, 489 §, 507 †
Ordemann, W., Beiträge zur morphologischen Entwicklungsgeschichte der deutschen Nordseeküste, 504 †
Ordnance Survey—
Maps of England and Wales, † 92, 196, 307, 413, 514, 608
Maps, their meaning and use: M. L. Newbigin, 298 †
Progress of Ordnance Survey, Report of, 55 §, 506 †
Ordoñez, E., Pico de Tancitaro, Michoacán, 510 †
Orel, Ritter von, Stereo-Autograph, 364
Orissa and her remains: M. M. Ganguly, 189 †
Orlov, A. J., Observations sur les déformations de la terre sous l'influence de l'attraction de la lune, 410 †
Osborn, T. G., Note on submerged forest of Llanaber, Barmouth, 506 †
Ostler, A., Arabs in Tripoli, 191 †
Oswald, F., From Victoria Nyanza to Kisii Highlands, 114 *; R.G.S. award to, 359
Otter-Barry, R. B., Mongolia; Report on a journey, May to June, 1911..81 †
Oudh—
District Gazetteers of the U.P. of Agra and Oudh: H. R. Nevill and others, 81 †
Owendo point, French West Africa, 387
Oxford—
Geography, School of, Report for 1912 ..496
Oxfordshire—
Place-names of Oxfordshire: H. A. Alexander, 188 †, 272 §
Ozarks Highlands, Missouri, 41, 131

P.

Pacific—
Discovery by Vasco Nuñez de Balboa, 517
Earthquake origins in South-West Pacific in 1910: G. Hogben, 87 †

Pacific—*continued.*
Maps: Meteorological Charts (U.S. Weather Bureau), †96, 199, 418, 612; Pilot Charts (U.S. Hydrog. Office), †96, 199, 311, 418, 612; Stille Ozean: M. Groll, 310 †
Salinity of Surface Water in North Pacific Ocean, Study of: A. H. Clark, 379 §
Pacific Islands—
Adventures among South Sea Cannibals: D. Rannie, 159 §
Südsee-Inseln: G. Friederici, 87 †
Packard, W., Florida Trails, 59 §
Page, J., Land of Peaks and Pampas, 605 †
Palestine—
Camera crusade through Holy Land: D. L. Elmendorf, 601 †
Immovable East; studies of people and customs of Palestine: P. J. Baldensperger, 601 †
Land that is desolate: Sir F. Treves, 82 †
Naturwissenschaftliche Studien am Toten Meere und im Jordantal: M. Blanckenhorn, 82 †
Palmyra—
Insel Palmyra und der Panamakanal: H. Wichmann, 87 †
Pamirs—
Pamirexpedition, 1911-12, Bericht über bisherigen Verlauf meiner: A. V. Schultz, 404 †
Panama—
Little-known parts of Panama: H. Pittier, 192 †
Old Panama and Castella del Oro: C. L. Anderson, 60 §
Panama Canal—
Canal de Panama, Océanie française et le: J. Goulven, 511 †
Globe, Philips', of Panama Canal Route, 516 †
Gravitation Waves in Culebra Cut, On Panama Canal, and formation of: V. Cornish, 239 *
Handbook, Official, of Panama Canal (Isthmian Canal Commission), 605 †
Isthmian Canal Commission, Annual Reports, 192 †, 605 †
Landslides, Panama Canal and philosophy of: V. Cornish, 408 †
Maps: *Daily Mail* Chart of Panama Canal: G. Philip & Son, 610 †; Gray's Aero View of Panama Canal, 416 †
Palmyra, Insel, und der Panama Kanal: H. Wichmann, 87 †
Panama and the Canal to-day: F. Lindsay, 60 §
Pictures of Panama Canal: J. Pennell, 312 †
Traffic and Tolls: E. R. Johnson, 304 †
Panggi tribe, Abor country, 101
Pangin, Abor country, 99
Papua—
Mafulu Mountain People of British New Guinea: R. W. Williamson, 60 §
Papua, or British New Guinea: J. H. Murray, 86 †
Papua, Report for 1911. Parliament of Commonwealth of Australia, 86 †
Pará, Port of: A. Hale, 605 †
Paraguay—
Jesuit land, In: W. H. Koebel, 304 †
Paris—
Handbook for Travellers. Paris and Environs: K. Baedeker, 402 †
Parkman, Francis, Works of, 84 †, 480 §
Partsch, J., Durch Sweden nach Lappland, 187 †; Lage von Stockholm, 506 †
Patagonia—
Geography of Southern Patagonia: J. B. Hatcher, 90 †
Travels in Patagonia and Tierra del Fuego: C. W. Furlong, 85 †
Visit to Patagonia: W. G. R. Smith, 192 †
Patkanof, S., Données statistiques sur décomposition ethnique de population de Sibérie, 508 †
Paulsen, O., Studies on Vegetation of Transcaspian Lowlands, 578 §
Pavillard, J., Essai sur nomenclature phytogeographique, 512 †
Pawlowski, A., l'Île de Bouin, 401 †
Payas, Asia Minor, 246
Payer, J. de, Scientific Expedition to Franz Josef Land, 289
Peach, B. N., Report on rock specimens, 194 †; and others, Geology of Ben Wyvis, etc., 506 †
Pearson, H. D., R.G.S. award to, 359
Peary channel, Greenland, 317
Pelliot, P., Conférence de (sur son voyage du Turkestan russe au Kan-sou), 189 †
Pemba—
Maps: Pemba Island (Geog. Section, General Staff), 415 †
Penal Settlements—
Strafkolonien, Meine Reise nach dem: R. Heindl, 306 †
Penck, A., Schliffkehle und Taltrog, 87 †; Lepsius über Einheit und Ursachen der diluvialen Eiszeit in den Alpen, 400 †
Pennell of Bannu, 89 †
Pennell, J., Pictures of Panama canal, 312 †
Peppler, A., Zur Aerologie tropischer und Subtropischer Ozeane..88 †
Pergameni, C., Exploration du Grönland, 511 †
Périgny, M. de, Mission dans l'Amérique Centrale 1909-10..408 †
Perm—
Map of Perm Government: A. Ilyin, 93 †
Perret, F. A., Flashing arcs: a volcanic phenomenon, 513 †; Volcanic vortex rings, etc., 513 †

Persia—
Journal of a diplomat's three years' residence in Persia: E. B. Eastwick, 90 †
New account of East India and Persia, 1672–1681: J. Fryer, 300 †
Peru—
Bevölkerung der Sierra von Nordperu, Zur Kenntnis der: W. Sievers, 408 †
Boundary between Peru and Bolivia, letter from H. Toppin on, 295
Distancia entre Callao y Puerto Bermúdez, Calculo geodésico de la, 605 †
Précolombien du Bas-Pérou, Étude sur: P. Berthon, 408 †
Putumayu and question of boundaries between Peru and Colombia: Sir C. Markham, 145 *
Putumayo, the Devil's paradise: W. E. Hardenburg, 192 †
Vitcos, last Inca capital: H. Bingham: 408 †
Yale Peruvian Expedition of 1912, Return of, 390; Medical Report of: W. G. Erving, 304 †
Perugia—
Fenomeni carsici nei terreni Mesozoici ad est di Perugia: P. Principi, 505 †
Peters, W. J.: *see* Bauer, L. A.
Petrof, T., Caves Yel-Khoba and Kharanlyk-Khoba in Crimea, 187 †
Pettersson, O., Connection between hydrographical and meteorological phenomena, 88 †
Peucker, K., Griechenland und das Ägäische Meer (map), 92 †; Königreich Bulgarien und zentralen Balkanländer zwischen Adria und Pontus (map), 413 †
Pfaundler, R. v., Ergebnisse der Volkszählung vom 1910 in den deutsch-österreictrischen Alpenländern, 401 †
Philip, G., Visual Contour Atlas, 417 †
Philip, G., & Son, *Daily Mail* Chart of Panama Canal, 610 †
Philippines—
American occupation of Philippines, 1898–1912: J. H. Blount, 301 †
Corn Culture in Philippine Islands: S. H. Sherard and H. T. Edwards, 507 †
Natural bridge on Luksuhim stream: P. R. Fanning, 386
Rice Culture in Philippines: C. M. Conner, 507 †
Philippson, A., Glaziale Taltrog, 513 †
Philips' Geo-graph Book: J. H. Hack, 416 †
Philips' Panama Canal Route Globe, 516 †
Philips, G., Cambridge County Geographies. Rutland, 188 †
Phillips, C. E., Electrical and other properties of Sand, 512 †
Phillips, P. L.: *see* Lowery, W.
Phlerovski, A., From Satka Works to Irmel Mountains, 187 †
Photogruphic Surveying—
Emploi des appareils panoramiques dans levés photographiques: M. Callot, 606 †
Geschichtliche Entwicklung der Photogrammetre, etc.: M. Weiss, 305 †
Photographic Surveying Instruments, 363
Photographs—
Africa Central: C. Buxton, 199
Asia, Africa, South America, and Canary Islands: W. L. Schnaider and others, 419 †
China and Korea: Mrs. Bishop, 418 †
Colombia: J. A. Tregelles, 200 †
Himalayas: G. S. Ingram, 200 †
Jan Mayen: J. B. Charcot, 311 †
Kelowna, British Columbia: G. H. Hudson, 311 †
Labrador, Eskimos in: S. K. Hutton, 312 †
Ngamiland: A. G. Stigand, 200 †
Nitinat district, Vancouver Island, 612 †
Panama Canal, Pictures of: J. Pennell 312 †
Physiography—
High Schools, Physiography for: A. L. Arey, and others, 162 §
New physiographic terms, Some suggested: D. Cairnes, 194 †
Physiological observations made on Pike's Peak, Colorado: C. G. Douglas and others, 607 †
Phytogeography—
Nomenclature phytogéographique, Essai sur: J. Pavillard, 512 †
Piche, G. C., Notes sur l'Abitibi, 604 †
Pieri, S., D'alcuni elementi etruschi nella toponomastica toscana, 505 †
Piers, H., Brief account of Micmac Indians of Nova Scotia and their remains, 509 †
Pilatus—
Pilatus und seine Geschichte: P. X. Weber, 598 †
Pilhofer, G., Reise von Finschhafen nach dem Markhamfluss, 86 †
Pillsbury, J. E., Grandest and most mighty terrestrial phenomenon: Gulf stream, 305 †
Pittier, H. F., Kostarika, 303 †, 479 §; Little-known parts of Panama, 192 †
Pittman, E. F., Coal resources of New South Wales, 86 †, 287 §
Pittsburgh, Prevention of floods at: G. B. Roorbach, 303 †
Plane-tables and folding alidades, 257
Plants—
Arabische Pflanzennamen aus Ægypten, Algerien und Jemen: G. Schweinfurth, 89 †
Geological relations of stable and migratory plant formations: C. B. Crampton, 194 †
Germany, Western, Plant migration in: E. Krause, 66

Platania, G., Grande eruzione etnea del Settembre 1911..80 †
Po river—
Trasformazioni idrografiche del delta padano avvenute del secolo xix.: M. Baratta, 505 †
Pohlig, H., Ancienne embouchure de la Meuse près de Bonn, 402 †
Pointe Noire, French Equatorial Africa, 387
Pole to Pole, From: S. Hedin, 195 †, 585 §
Polovnikoff, V., Surveying operations of Irkutsk-Bodaybo railway, 190 †
Pomaks, West Thrace, 334
Pomerania—
Landschaftliche Skizzen von der pommerschen Boddenküste: H. Stübler, 504 †
Vorpommerns Küsten und Seebäder: M. Friederichsen, 371 §
Ponape: P. Hambruch, 409 †
Poppen, H., Sandbänke an der Küste der Deutschen Bucht der Nordsee, 80 †
Population—
Bevölkerungsstatistik der Länder ohne Volkszählung: A. N. Kiær, 195 †
Population-maps—
Generalisierung von Gemeindekartogrammen zu Volksdichtekarten: O. Schlüter, 514 †
Kartographische Darstellung de Volksdichte: K. Closterhalfen, 514 †
Porsild, M. P., Ueber einige Geräte der Eskimo, 511 †; Vascular plants of West Greenland, 605 †
Port Nelson, Hudson's Bay, Hydrographical survey of, 286
Portolan charts: E. L. Stevenson, 62 §
Portugal, King Manoel of, Election as Honorary Member of R.G.S., 383
Portugal—
Handbook for travellers. Spain and Portugal: K. Baedeker, 599 †
Maps: Carta de Portugal, 608 †
Portuguese self-taught: E. de Cunha, 298 †
Poting Glacier, Notes on: — Grinlinton, 300 †
Poynting, J. H., Earth: its shape, size, weight, and spin, 410 †
Pradelle, J., Permanent International Association of Navigation Congresses. Bibliographic Notes, 607 †
Pratt, E. A., History of inland transport and communication in England, 299 †
Preller, C. du R., letters on Tsang-po and Dihong, 293, 500
Preradović, D. v., Ein handschriftlicher Kartenatlas des Königl. Landesarchivs zu Agram, 411 †
Presidential Range, North America, Former Glaciation in, 490
Price, M. P., Siberia, 476 §
Prince Albert sound, Eskimo of, 454
Prince Edward Island, Geological age of: L. W. Watson, 509 †
Prince Regent Luitpold Land, Antarctic, 172
Principi, P., Fenomeni carsici nei terreni Mesozoici ad est di Perugia, 505 †
Prins Hendrik mountain, New Guinea, 591
Prjevalski range, China, 565
Provence—
Alpes de Provence: G. Tardieu, 474 §
Languedoc, Provence and: C. Headlam, 153 §
Przybyllok, E., Report on German Antarctic Expedition, 356
Psalmanassar, G., Historical and geographical description of Formosa, 91 †
Putumayo—
Devil's Paradise: W. E. Hardenburg, 192 †, 481 §
Putumayu and question of boundaries between Peru and Colombia: Sir C. Markham, 145 *
Pyrenees—
Histoire cartographique des Pyrénées-Orientales: R. Descharmes, 505 †
Passes of the Pyrenees: C. L. Freeston, 298 †
Route des Pyrénées, 505 †

Q.

Quatrembre, E., Mémoires géographiques et historiques sur l'Égypte, 91 †
Quebec—
Maps: Ungava Territory (Dept. of Colonisation), 416 †
Province de Québec, Plus ancienne carte de: B. Sulte, 407 †
Rivière du Désert: J. G. Bourinot, 407 †
Queen Maud's ranges, Antarctic, 12, 13
Queensland—
Région des rivières Barron et Russell: J. N. Daneš, 193 †
Volcanic activity in South-East Queensland, Notes on geological age of: E. O. Marks, 409 †

R.

Rabot, C., and E. Muret, Variations périodiques des Glaciers, 410 †
Radde, G., Autobiographie von: K. F. Hahn, 514 †
Radiation: *see* Meteorology
Radley district; its history, etc.: T. Field, 403 †
Raestad, A., Spitsberg dans l'histoire diplomatique, 160 §
Railways—
Africa and Near East, Railway projects in: Sir H. H. Johnston, 306 †
Rain (*see also* Meteorology)—
Distribution of rain . . . over British Isles during 1911: H. R. Mill, 188 †
Norfolk, Unprecedented rainfall in, 188 †
Pluie normale théorique: L. Dumas, 411 †

Range, P., Topography and geology of German South Kalahari, 68 §, 302 †
Rangoon Harbour, Chart of: A. S. Hunton and V. G. Smith, 199 †
Rannie, D., My Adventures among South Sea Cannibals, 159 §
Rasmussen, K., Expedition in Northern Greenland, 593
Raunkiær, B., Expedition of Royal Danish Geographical Society to Arabia, 189 †
Raveneau, L., Annales de Géographie. Deuxième table décennale 1902–11.. 412 †
Ravenna, a study: E. Hutton, 599 †
Ravenstein, E. G., obituary, 497
Rawling, C. G., Land of New Guinea pygmies, 409 †
Reckstad, J., Ausfüllung eines Sees vor dem Engabrä als Mass der Gletschererosion, 411 †
Redway, J. W., letters from: on Fluctuating Climate of North America, 75; on Mountain Sickness, 176; on Salinity of Walker Lake, 178, 296
Reeves, E. A., Some new and improved Instruments and Apparatus for Geographical Surveying, 249 *, 359 *
Reid, T. H.: *see* Wright, A.
Rekstad, J., Forandringer ved norske bræer i aaret 1910–11..505 †
Revelli, P., Il trattato della marea di Jacopo Dondi, 513 †
Reviews—
Abor Jungles, In: A. Hamilton, 274
Abor, On track of the: P. Millington, 476
Africa, British East, Handbook of: H. F. Ward and J. W. Milligan, 59
Africa, Central, Chiefs and Cities of: O. Macleod, 57
Africa, Dawn in Darkest: J. H. Harris, 581
Alpes de Provence: G. Tardieu, 474
Alps, Building of: T. G. Bonney, 151
Alps de Savoie: E. Gaillard, 474
Alps, Englishmen in the: A. Lunn, 475
Andorra, Hidden Republic: L. G. Leary, 576
Arctic Expedition, Second Norwegian, in the *Fram*, 1898–1902, Report of, 584
Arctic, Lost in the: E. Mikkelsen, 481
Arctic Prairies: E. T. Seton, 59
Argentine; telle qu'elle est: P. Walle, 479
Atlantic Ocean, North, Sub-Oceanic Physiography of: E. Hull, 279
Atlantischen Ozeans, Geographie des: E. Hull, 279
Atmosphere in Clear Weather, Structure of: C. J. Cave, 60
Austria; her People and their Homelands: J. Baker, 154
Belgium, Handbook to (Ward, Lock & Co.), 475
Borneo, Pagan Tribes of: C. Hose and W. McDougall, 576
Reviews—*continued.*
Bottnischen und Finnischen Meerbusens, Zusammenfassende Uebersicht der Hydrographie des: R. Witting, 473
Brenner Pass: C. L. Clare, 575
British Columbia; its History, People, etc.: H. J. Boam, 584
Bush, In Shadow of the: P. A. Talbot, 477
Cambridge Geographical Text-Books, Intermediate: A. J. Dicks, 162
Ceylon. Einführung in die Tropenwelt: K. Guenther, 581
Chau Ju-Kua: F. Hirth and W. W. Rockhill, 374
China, Northern, and Korea: J. Madrolle, 580
Congo Cannibals, Among: J. H. Weeks, 477
Côte d'Ivoire, Fondation de Colonie Française de: F. Bullock, 377
Dublin, Neighbourhood of: W. St. J. Joyce, 371
England's Riviera: J. H. Stone, 371
Florence, A Wanderer in: E. V. Lucas, 154
Florida Trails: W. Packard, 59
Four Continents, My Life in: Colonel Chaillé-Long, 484
Genoese World-Map, 1457: E. L. Stevenson, 62
Geographical Discovery in Seventeenth and Eighteenth Centuries, History of: E. Heawood, 381
Geographical Names, Pronouncing Vocabulary of: G. G. Chisholm, 163
Geography, Elementary: F. D. Herbertson, vols. 5 and 6..162
Geography, New Preliminary: H. B. Wetherill, 162
Geography, Physical, An Introduction to: M. I. Newbigin, 161
Geography, Physical, Class Book of: A. T. Simmons and E. Stenhouse, 161
Geography, Questions and Exercises in: R. J. Finch, 163
Guadalquivir: P. Gwynne, 575
Hausa Superstitions and Customs, A. J. Tremearne, 582
Hills, Secrets of the: S. Craig, 163
Historical Geographies. South Africa: J. R. Fisher, 162
Hunting Day-Book, From my: H. I. H. German Crown Prince, 63
India, Empire of: Sir B. Fuller, 579
India, Pioneers in: Sir H. Johnston, 581
India, Royal visit to: Hon. J. Fortescue, 580
India, Survey of, Records, 154
Ireland, Murray's Handbook for, 272 †
Isostasy in India, Investigation of Theory of: H. L. Crosthwaite, 374
Italian Travel Sketches: J. Sully, 474
Italy, Southern, and Sicily: K. Baedeker, 576

Reviews—*continued.*
Journey from Prince of Wales' Fort in Hudson's Bay to Northern Ocean in 1769–1772: S. Hearne. Edited by J. B. Tyrell, 379
Jungles Moï: H. Maitre, 475
Karakoram and Western Himalaya, 1909: F. de Filippi, 156
Kostarika: H. F. Pittier, 479
Labrador, Among Eskimos of: S. K. Hutton, 378
Labrador, In Northern: W. B. Cabot, 479
Langholm as it was: J. and R. Hyslop, 154
Lombardy, Cities of: E. Hutton, 154
Libya Italica: P. Vinassa, 477
Libyan Desert, Wayfarers in: Lady E. Cobbold, 478
Lucca: J. Ross and N. Erichsen, 575
Lushei Kuki Clans: J. Shakespear, 580
Mafulu Mountain People of British New Guinea: R. W. Williamson, 60
Map Projections: A. R. Hinks, 278
Maroc Physique: L. Gentil, 157
Mecca, Modern Pilgrim in: A. J. Wavell, 273
Mexico, Ancient, Civilization of: L. Spence, 59
Navigation, The New: F. C. Cross, 483
Nepal, Picturesque: P. Brown, 579
New Grange: G. Coffey, 272
Nigeria and its Tin Fields: A. F. Calvert, 158
Nigeria, Southern, Handbook of Survey: F. G. Guggisberg, 56
Nigeria, Tailed Head Hunters of: A. J. Tremearne, 582
Nile Valley, Christian Antiquities in: S. Clarke, 377
Normandie, Haute: J. Fossey et J. Longnon, 474
Ordnance Survey, Report of Progress to 31st March, 1912..55
Oxfordshire, Place-names of: H. A. Alexander, 272
Pacific Ocean, North, Study of Salinity of Surface Water in: A. H. Clark, 379
Panama and the Canal to-day: F. Lindsay, 60
Panama, Old, and Castella del Oro: C. L. Anderson, 60
Parkman, Francis, Works of, 480
Physiography for High Schools: A. L. Arey and others, 162
Pole to Pole, From: S. Hedin, 585
Portolan Charts: E. L. Stevenson, 62
Provence and Languedoc: C. Headlam, 153
Putumayo; Devil's Paradise: W. E. Hardenburg, 481
Rockies, Spell of the: E. A. Miles, 59
Romanization of Roman Britain: F. Haverfield, 272
Rome: H. T. Inman, 272
Reviews—*continued.*
Scinde in the Forties; being Journals, etc., of Colonel K. Young: A. F. Scott, 376
Seistan: G. P. Tate, 373
Shên-Kan, Through: R. S. Clark and A. de C. Sowerby, 276
Siberia: M. P. Price, 476
Sibiriens, Die Kolonisation: P. A. Stolypin und A. W. Kriwoschein, 376
Somalia Italiana nei tre anni del mio governo: G. de Martino, 581
South Sea Cannibals, My Adventures among: D. Rannie, 159
Spitsberg dans l'histoire diplomatique: A. Racstad, 160
Spitsberg, Exploration du Nord-Ouest du: G. Isachsen, 482
Sugar-cane Industry, Past and Present, The World's: P. Geerligs, 63
Timbuctu, Through, and across Great Sahara: A. H. Haywood, 278
Transcaspian Lowlands, Studies on Vegetation of: O. Paulsen, 578
Tripolitaine, En: E. Bernet, 477
Troy: a Study in Homeric Geography, 371
Vorpommerns Küsten und Seebäden: M. Friederichsen, 371
Wanderings on Italian Riviera: F. Lees, 273
Wilderness and Jungle, Book of the: F. Aflalo, 63
World Geography for Junior Students, Essentials of: J. F. Unstead and E. G. Taylor, 162
Yorkshire Coast, Lost Towns of: T. Sheppard, 370
Yosemite Trails: J. S. Chase, 59
Reynolds-Ball, E. A., Cairo of to-day, 83 †
Rhine—
Geographische Entwicklung des Rheindeltas bis um das Jahr 1500: A. Nordlind, 80 †
Rheinlande in naturwissenschaftlich geographischen Einzeldarstellungen: C. Mordziol, 402 †
Rhodesia—
Mineral Survey of zinc and lead deposits of Broken Hill: A. Zealley, 406 †
Rhone—
Cañon du Rhône: E.-A. Martel, 79 †
Rhubarb—
Stammpflanze des offizinellen Rhabarbers u. d. geographische Verbreitung der Rheum-Arten: C. C. Hosseus, 512 †
Ricci, L., Distribuzione altrimetrica della popolazione nel bacino del Nocc, 504 †
Rice, H., Journeys in Upper Basins of Orinoco and Amazon, 589
Richardson, R., A comparison of Climate of Edinburgh and Bournemouth, 299 †
Richmond, E., Significance of Cairo, 602 †

Richthofen, Baron v., China. Review by W. R. Carles, 562
Rickmers, W. R., Duab of Turkestan, 301 †
Rieznichenko, V., On ancient and contemporary glaciers of South-Western Altai mountains, 600 †
Riggs, T., Surveying 141st meridian, 191 †
Rikli, M., and C. Schröter, Vom Mittelmeer zum Nordrand der Algerischen Sahara, 405 †
Ripple-marks: C. Epry, 606 †
Riu, Abor country, 100
Rivers—
Rivers and Estuaries, or Streams and Tides: W. H. Hunter, 607 †
Rivet, P. (*see also* Créqui-Montfort, G. de) Affinités du Tikuna, 511 †; Familles Linguistiques du Nord-Ouest de l'Amérique du Sud, 511 †
Riviera—
Wanderings on Italian Riviera: F. Lees, 273 §
Robinson, J. B.: *see* Heaton, E.
Rock Specimens, Report on: B. N. Peach, 194 †
Rockhill, W. W. (*see also* Hirth, F.) 1910 Census of population of China, 300 †
Rocky mountains—
Spell of the Rockies: E. A. Miles, 59 §
Rogers, J. D., John Macarthur, 195 †
Roget, F. F., Ski-runs in High Alps, 186 †
Rohan-Chabot Expedition in Angola, 163
Rolf, B., Observations de Jens Munck dans baie d'Hudson en 1619 et 1620.. 513 †
Rome—
Rome: H. T. Inman, 272 §
Roncière, C. de la, Portulan du XV^e^ siècle découvert à Gap, 411 †
Roorbach, G. B., Prevention of floods at Pittsburgh, 303 †
Rosenvinge, L. K., and E. Warming, Botany of Iceland, 80 †
Ross barrier, Antarctic, 1
Ross, J., and N. Erichsen, Lucca, 575 §
Rottmann, H., Plan einer russischen Eisenbahn am Schwarzen Meer, 505 †
Roume, V. E., Chemins de fer en Afrique et transafricain, 405 †
Roussilhe, M., Régime des crues dans réseau fluvial congolais, 602 †
Routledge, W. S., Research expedition to Easter Island, 494
Royal Geographical Society—
Antarctic Disaster: Messages of Condolence, 220, 355, 486
Lectures to Young People, 179
Library of, Older works added in 1911–12..90,
Livingstone Centenary, Special Meeting, 421
Medals and awards for 1913..358
Meetings of, Session 1912–13..78, 178, 296, 399, 502, 596
Royal Geographical Society—*continued.*
New Premises at Kensington, 180
Portugal, King Manoel of, Election as Honorary Member, 383
Research Dept. Meetings, 597
Special General Meeting, January 15.. 179
Women: Admission as Fellows, 179
Ruanda District, Central Africa, 539, 548
Rudge, W. A., On variation in value of atmospheric electrical potential with altitude, 512 †
Rukiga District, Central Africa, 537, 538, 545
Rumania—
Gaseruption bei Kissármás, Ueber die: L. v. Lóczy, 505 †
Petroleumgebiete Rumäniens, L. v. Lóczy, 505 †
Rumelia—
Historical geography, 334
Russanof, —, Expedition to Novaya Zemlya, 171
Russia—
Asia, Russia on borders of: E. T. Turnerelli, 91 †
Commerce and industries of European Russia, 187 †
Explorations géologiques le long des rivières Lovate, Kounia, etc.: N. J. Vassilevsky, 298 †
Maps: European Russia (Top. Dept. General Staff), 608 †; Perm Government: A. Ilyin, 93 †
Orographical Sketch of Central and Southern Polesie: P. A. Tutkovski, 187 †
Russischen Eisenbahn am Schwarzen Meer, Plan einer: H. Rottmann, 505 †
Rutland—
Cambridge County Geographies. Rutland: G. Phillips, 188 †
Ruwenzori—
Am Ruwenzori: M. Weiss, 406 †
Rux, W.: *see* Kuntz, J.

S.

Sabinio mountain, Mufumbiro range, 535
Sachse, P. W., Positions in Dutch Guiana, 591
Sahara—
Chemins de fer transafricains, Mission d'études des: R. Chudeau, 406 †
Duponchel à Berthelot, De: L. Boyer, 406 †
Great Sahara, Through Timbuctu and across: A. H. W. Haywood, 278 §
Maps: Carte de l'Aïr: Captain Cortier and others, 93 †
Oasis de Djanet: E. Ardaillon, 509 †
Railway Expedition under Captain Nieger, 386
Rapport de tournée; In-Salah, Hassi-Boughessa, etc.: Lieut. Duclos, 406 †

Sahara—*continued.*
Sahara Marroqui y la Mauritania: M. Conrotte, 406 †
Touareg Ajjer, Notes sur: E. Ardaillon, 406 †
Tufs gypseux et calcaires du Bas-Sahara: X. Stainer, 509 †
St. Augustine river, Labrador, 343
St. Louis, Missouri, Development of, 138
Saltoro and Baltoro, letter from H. H. Godwin-Austen on spelling of, 175
Salwin-Mekong divide, 586
Salzburg—
Klimatographie von Salzburg: A. Fessler, 598 †
Samarra—
Ausgrabungen von Samarra, Erster vorläufiger Bericht über die: E. Herzfeld, 301 †
Samland—
Strandverschiebungen an der Küste des Samlands, Beobachtungen über: R. Brückman und E. Ewers, 281 §
Samoa—
American Samoan islands, A new map of, 193 †
Vulkan in Samoa, Letzte: L. Imhoff, 511 †
Sand—
Electrical and other properties of sand: C. E. Phillips, 512 †
Sandström, J. W., Hydrometrische Versuche, 194 †; Ueber die Energieumwandlungen in der Atmosphäre, 88 †
S. Siro, Fratello F. M. di, Viaggi in oriente ed in occidente del: P. Donazzolo, 513 †
Santa Fe trade in Missouri, 140
Santarem, Visconde de, Opusculos e esparsos: J. de Freitas, 195 †
Santos, B. J. dos, Mappa do Estado de Minas Geraes, 94 †
São Paulo—
Maps: Carta Geral do Estado de S. Paulo, 197 †; Viação Ferrea de São Paulo e Partes dos Estados Vizinhos: R. Heyse, 94 †
Sapper, K., Ende des Matavanu-Ausbruchs auf Savaii, 409 †
Sarawak—
Pagan tribes of Sarawak, 577
Sargent, A. J., Australasia. Eight lectures prepared for Visual Instruction Committee of Colonial Office, 408 †
Sargent, R. H., Progress of Alaskan Surveys, 70
Savaii—
Ende des Matavanu-Ausbruchs auf Savaii: K. Sapper, 409 †
Savoy—
Alps de Savoie: E. Gaillard, 474 §
Sawicki, L., Etudes glaciaires dans les Karpates, 80 †; Zum Landschaftsbild der Insel Wight, 506 †
Sawkins, J. G., Reports on geology of Jamaica, 91 †
Scandinavia—
Postglaziale Klimaschwankungen im skandinavischen Norden: R. Sernander, 187 †
Scheck, F., Einfache und stereoskopische Bildmessung im reinen Felsgebiete, 410 †
Scheltema, N., Determination of geographical latitude and longitude of Mecca and Jidda, 189 †
Scherer, J., Great earthquakes in island of Haiti, 511 †
Scheu, E., Monographies de quelques grands sismes de l'année 1907..411 †
Schilling, G.. Bodzawendung, 403 †
Schirmer, F., Kriegsgeschichtlicher Atlas zum Studium der Feldzüge der neuesten Zeit, 611 †
Schlobach, G., Deutsch-Ostafrika, 509 †
Schlüter, O., Generalisierung von Gemeindekartogrammen zu Volksdichtekarten, 514 †
Schmeckebier, L. F., Our National Parks, 85 †
Schmidt, W., and C. Grotewold, Argentinien in geographischer . . . Beziehung, 303 †
Schnaider, W. L., and others, Photographs of Asia, Africa, South America, and Canary Islands, 419 †
Schnee, —, Bilder aus den Karolinen und Marianen, 409 †
Schnell, P., Zur Kartographie Nordmarokkos, 83 †
Schomburgk, H., Western Liberia, surveyed and drawn for Liberian Government, 93 †
Schorn, J., Bericht über das Erdbeben in den Alpen, 400 †
Schott, G., Geographie des Atlantischen Ozeans, 88 †, 279 §
Schoy, K., Näherungsweise Bestimmung der Polhöhe in sehr hohen Breiten, 410 †
Schrader, F., Année Cartographique, 198 †
Schröber, C.: *see* Rikli, M.
Schröder-Stranz, —, Arctic Expedition, 171, 289; Disaster to Expedition in Spitsbergen, 593
Schuiling, R., Nederlandsche vluchtheuvels, geographisch beschouwd, 186 †
Schultz, A. v., Bericht über den bisherigen Verlauf meiner Pamirexpedition, 1911–12..404 †
Schumann, R., Geoidabstände nach der Formel von stokes bei schematischen Schwerebelegungen, 88 †
Schwarz, E. H., Bartholomieu Dias's furthest East, 595 §, 602 †; Post-Jurassic earth-movements in South Africa, 603 †
Schweinfurth, G., Arabische Pflanzennamen aus Ägypten, Algerien, und Jemen, 89 †; and A. Borzi, Monografie e rapporti coloniali. Lettera Sulla Libia, 603 †

Schwetz, —, Au Tanganika. Les vents du lac, 67 §, 508 †
Schwetz, J., Exploration de rivière Lukuga, 602 †
Scientific Papers: J. Y. Buchanan, 410 †
Scinde in the Forties: A. F. Scott, 376 §
Scotland—
Gateway of Scotland: A. G. Bradley, 299 †, 474 §
Geology of Ben Wyvis, etc.: B. N. Peach and others, 506 †
Geology of districts of Braemar, etc.: G. Barrow and others, 299 †
Maps: Bathyorographical map of Forth and Tay: W. & A. K. Johnston, 413 †
Schottische Seenforschung: A. Merz, 506 †
Scott, A. F., Scinde in the Forties; being Journal, etc., of Colonel K. Young, 376 §
Scott, Lady, Casket presented by R.G.S., 358; Honour for, 222; Return of, 485
Scott, R. F., Antarctic Expedition; Second Year's Results, 222; Death of, and Memorial Service to, 201, 210; French Memorial to, 486; obituary of: Sir C. R. Markham, 217
Scully, W. C., Reminiscences of South African Pioneer, 603 †
Searcy, A., By flood and field; adventures . . . in North Australia, 87 †
Sea-water—
Light penetration in Sea-water: K. Grein, 290
Seckt, H., Contribución al conocimiento de la vegetatión del noroeste de la República Argentina, 604 †
Sedgwick, F. R., Visit to some battlefields in Northern Virginia, 408 †
Seine—
Fonds marins de la baie de Seine, Étude des: M. G. Thoulet, 599 †
Seismology (*see also* Earthquakes)—
Monographies de quelques grands sismes, 1907: E. Scheu, 411 †
Seismische Bodenunruhe: B. Gutenberg, 194 †
Seistan—
Memoir on history . . . of the country: G. P. Tate, 190 †, 373 §
Seler, E., Meine Reise durch Süd-Amerika in Jahre 1910..408 †
Seligsohn, M.: *see* Houtsma, M. T.
Semirechensk, Earthquake in: S. Grigorief, 82 †
Semple, E. C., American history and its geographic conditions, 303 †
Senegal—
Fouladou, La: R. Legrand, 509 †
Sernander, R., Postglaziale Klimaschwankungen im skandinavischen Norden, 187 †
Serret, F., Voyage en Colombie, 304 †
Servia—
Évolution des habitations, Influence de l'economie sur: T. R. Gjorgjević, 187 †
Resinous woods of Sharplanina and Korab: N. Koshanin, 187 †
Seton, E. T., Arctic Prairies, 59 §
Sextant and Theodolitic Observation at Low Altitudes, 366
Shackleton, Sir E., remarks on "Norwegian South Polar Expedition," 15
Shakespear, J., Lushei Kuki Clans, 580 §
Sharpe, Sir A., remarks on "David Livingstone," 446; "Mufumbiro Mountains," 548
Shaw, W. N.: *see* Dines, W. H.
Sheane, J. H. W., obituary, 397
Sheldon, C., Wilderness of North Pacific coast islands, 303 †
Shên-Kan, Through: R. S. Clarke and A. de C. Sowerby, 276 §
Sheppard, T., Lost towns of Yorkshire coast, 81 †, 370 §
Sherard, S. H., and H. T. Edwards, Corn culture in Philippine Islands, 507 †
Shidlovsky, A. F., Spitsbergen in Russian history and literature, 606 †
Shilluk people, their language and folklore: D. Westermann, 191 †
Shitkow, B., Seeweg nach Sibirien, 82 †
Shockley, W. H., letters on Mountain sickness, 76, 178, 295
Siachen or Rose Glacier, Some Notes on my 1912 expedition to: F. B. Workman, 507 †
Siam—
Half-century among Siamese and Lão: D. McGilvary, 301 †
Siam and its productions, arts, and manufactures: G. E. Gerini, 301 †
Siberia—
Cartes de Sibérie au XVIIIe Siècle: G. Cahen, 404 †
Division de Sibérie en provinces phytogéographiques, Essai d'une: N. J. Kuznecov, 508 †
Geologische Skizze der Halbinsel Murawijew-Amursky und Insel Russky: P. v. Wittenburg, 405 †
Kolonisation Sibiriens: P. A. Stolypin and others, 376 §
Mapping of Siberia in Eighteenth Century: G. Cahen, 488
Population de Sibérie, Données statistiques sur décomposition ethnique de: S. Patkanof, 508 †
Seeweg nach Sibirien: B. Skitkow, 82 †
Siberia: M. P. Price, 476 §
Sibirischen Forschungsreisen des Grafen Karl Waldburg-Zeil, 301 †
Stellung der Sibirischen Ströme im Weltverkehr: R. Hennig, 82 †
Sidorenko, M., Petrographical description of the bottom samples from Lake Aral, 82 †
Sieberg, A., Topographischen Umgestaltungen auf dem Ätna, etc., 80 †
Sieger, R., Forschungen in der Almenregion, 503 †
Sierra Leone—
Maps: Africa. Sierra Leone (Geog. Section, General Staff), 309 †

Sievers, W., Zur Kenntnis der Bevölkerung der Sierra von Nordperu, 408 †
Silica and lime deposition: N. H. Darton, 87 †
Simbi crater lake, British East Africa, 125
Simko, G., Besiedelung von Nyiregyhaza und seiner Tanya's, 403 †
Simmons, A. T., and E. Stenhouse, A Class Book of Physical Geography, 161 §
Simmons, H. G., Revised list of flowering plants and ferns of North-Western Greenland, 409 †; Vascular plants in flora of Ellesmere Land, 409 †
Simong, Abor country, 103
Simotamai, H., Nachrichten über den Ausbruch des Vulkans Usu in Japan im Jahre 1910..404 †
Simpson, E. S., Notes on laterite in Western Australia, 409 †
Singewald, J. T., Report on iron ores of Maryland, 85 †
Sinic mountains, China, 563
Sironia, Jebel, Morocco, 231
Siyom river, Abor country, 100
Skinas, G. K., Kleinasiatischen Rosinen, 82 †
Sleeping sickness, spread of, 127
Smedberg, R., Hydrografi och vattenbyggnad skonst i Holland och Belgien, 402 †
Smith, A.: *see* Evans, F. J.
Smith, B., Ancient and modern Trent, 506 †; Glaciation of Black Combe district, 299 †
Smith, B. Leigh, obituary, 396
Smith, V. G.: *see* Hunton, A. S.
Smith, W. G. R., A visit to Patagonia, 192 †
Soils—
Geology of soils and subtrata: H. B. Woodward, 305 †
Soil-temperature—
Erdbodentemperatur in ihren Beziehungen zur Entwicklung der Vegetation: W. Naegler, 513 †
Solger, F., Schützende Rolle des Meer- und Flusswassers bei der Abtragung, 606 †
Somaliland—
Somalia Italiana nei tre anni del mio governo: G. de Martino, 302 †, 581 §
Somali tribes, 560, 561
South Victoria Land, mountains of, 8
Southport—
Wind and rainfall records, 1902–11: W. Marriott, 506 †
Sowerby, A. de C.: *see* Clark, R. S.
Spain—
Émigration espagnole: A. Girard, 505 †
Handbook for travellers. Spain and Portugal: K. Baedeker, 599 †
Speed and current chronographer: A. G. Noble, 410 †
Speight, R., Preliminary account of Lower Waipara gorge, 87 †
Spence, L., Civilization of ancient Mexico, 59 §, 84 †
Spencer, B., Scientific expedition to Northern Territory of Australia, 169
Spheroids—
Sfæroidens regnelinje: F. A. Buchwaldt, 606 †
Spiro Bey, S., New practical grammar of modern Arabic of Egypt, 191 †
Spitsbergen—
Coal Region of Central Spitzbergen: G. De Geer, 493, 606 †
Commercial development of Spitsbergen; R. N. R. Brown, 410 †
Expedition by Lieut. Schröder-Stranz, 171; Disaster to, 593
Expedition under Messrs. Hoel, Staxrud, and others, 592
Exploration du Nord-Ouest du Spitsberg: G. Isachsen, 193 †, 482 §
Geological excursion to Central Spitzbergen: G. De Geer, 511 †
Hydrographic observations of Isachsen Spitsbergen Expedition: G. Isachsen, 606 †
Nappes de lave, volcans et sources thermales dans environs de Baie Wood au Spitsberg: A. Hoel et O. Holtedahl, 304 †
Norwegian Researches in Spitsbergen, 592
Observations astronomiques faites au Spitsberg par l'expédition Isachsen: A. Alexander, 304 †
Russian history and literature, Spitsbergen in: A. F. Shidlovsky, 606 †
Sea west of Spitsbergen: B. Helland-Hansen and F. Nansen, 512 †
Spitsberg dans l'histoire diplomatique: A. Raestad, 160 §
Sporades—
Ricerche geologiche e geograficofisiche nelle Sporadi meridionali: A. Martelli, 503 †
Sprigade, P., Karte des Deutsche-Portugeisischen Grenzgebiets in Südwestafrika, 309 †; und M. Moisel, Grosser Deutscher Kolonialatlas, 197 †
Stadlmann, J., Entwicklung der Pflanzengeographie der Ostalpen in den letzten zehn Jahren, 401 †
Stainer, X., Tufs gypseux et calcaires du Bas-Sahara, 509 †
Stanford, E., Map of Country between Bulgaria and Constantinople, 93 †; Map showing proposed Railways, Tramways and other schemes affecting London, etc., 413 †; Map of Trinidad, 610 †
Stanford, W., Bacon's Large Scale Atlas of London and Suburbs, 308 †
Stanley, G. H., Note on Thaba Bosigo sand-dunes, 508 †
Statistique Annuelle de géographie humaine comparée, 1912: J. Birot, 412 †
Stavenhagen, W., Ueber Österreich-Ungarns Küstenverteidigung, 79 †

Staxrud, —, Explorations in Spitsbergen, 592
Steeb, Baron C., Flemmings namentreue Länderkarte von Oesterrich-Ungarn, 79 †
Steen, A. S., Terrestrial Magnetism, 409 †
Steensby, H. P., Etnografiske og antropogeografiske Rejsestudier i Nord-Grønland 1909..605 †
Steese, J. G., letter on Mountain Sickness, 177
Stefanini, G., Sull' antica idografia dei bacini della Meduna e del Colvera in Friuli, 505 †
Stefansson, V., Distribution of Human and Animal Life in Western Arctic America, 449 *; Expedition to Arctic Regions, 172, 289, 594
Stein, Sir M. A., Annual Report of Archæological Survey of India, 507 †
Stenhouse, E.: *see* Simmons, A. T.
Stephenson, H. H., Who's who in science, 195 †
Stereo-autograph, Orel's, 364
Sterro-photo surveying, 363
Steven, T. M., Geographical description of County of Ayr, 188 †
Stevenson, E. L., Genoese World-Map, 1457..62 §; Portolan Charts, 62 §
Stewart, C. E., A visit to London in year 1651..299 †
Stewart, E., Down Mackenzie and up Yukon in 1906..407 †
Stigand, A. G., Photographs of Ngamiland, 200 †
Stigand, C. H., Land of Zinj, 301 †
Stiny, J., Taltröge, 513 †
Stockholm—
Lage von Stockholm: J. Partsch, 506 †
Stockley, V. M., Big Game Shooting in India, Burma, and Somaliland, 607 †
Stockum, A. J. von, Astronomische plaatsbepaling van eenige punten in Suriname, 511 †, 590 §
Stollé, —, Expedition up Kaiserin Augusta River, New Guinea, 170, 390
Stolypin, P. A., and A. W. Kriwoschein, Kolonisation Sibiriens, 376 §
Stone, J. H., England's Riviera, 371 §
Størmer, C., Bericht über eine Expedition nach Bossekop, etc., 187 †
Stracey, B., Bergschrund Observations, 71
Strahan, Dr., remarks on "An English Desert," 572
Strauchon, J., New Zealand. Report on Scenery Preservation for 1911-12..86 †; Report of Department of Lands and Survey, New Zealand, 409 †
Strong, H. A., Syrian goddess; being translation of Lucien's "De Dea Syria," 301 †
Stübler, H., Landschaftliche Skizzen von der pommerschen Boddenküste, 504 †
Stummer, E., Das Lurnfeld, 401 †
Subansiri river, 500
Sudan—
Boyd Alexander's last journey: H. Alexander, 84 †
Cotton growing in Anglo-Egyptian Sudan, Report on possibilities of, 602 †
Maps: Anglo-Egyptian Sudan (Survey Office, Khartum), 308 †
Royal visit to Sudan, 1912, Story of: L. Weinthal, 602 †
Sahel Soudannais, Mission dans: F. de Zeltner, 406 †
Sudry, L., Étang de Thau, 598 †
Sugar-cane—
World's Sugar-cane Industry, Past and Present: P. Geerligs, 63 §
Sully, J., Italian Travel Sketches, 474 §
Sulte, B., De Montréal au Détroit en 1603..303 †; Plus ancienne carte de province de Québec, 407 †
Sumatra—
Maps: Schetskaart van het noordelijk gedeelte der Residentie Oostkust van Sumatra (Top. Bureau, Batavia), 609 †
Sunda—
Wissenschaftlicher Ergebnisse der Sunda-Expedition: J. Elbert, 404 †
Surrey—
Rainfall of Surrey (Geological Survey of England and Wales), 63 §
Water supply of Surrey: W. Whitaker and H. R. Mill, 299 †
Survey—
Einfache und stereoskopische Bildmessung im reinen Felsgebiete: F. Scheck, 410 †
Surveying instruments—
New and improved Instruments and Apparatus for Geographical Surveying: E. A. Reeves, 249 *, 359 *
School set of, 367
Sus, Wadi—
Ras el oued Sous: J. Ladreit de Lacharrière, 83 †
Sutherland, J., Adventures of an elephant hunter, 195 †
Sutton, J. R. and E., Some causes and effects of variation in range of temperature, 88 †
Sverdrup, O., and others, Report of Second Norwegian Arctic Expedition in *Fram*, 1898-1902..87 †
Sweden—
Durch Schweden nach Lappland: J. Partsch, 187 †
Mittelschwedischen Boden, Verbreitung . . . und Anwendung der: G. Andersson und H. Hesselman, 187 †
Valle Härad, a kame-area in Westergötland: H. W. Ahlmann, 506 †
Warnungsruf, Ein: S. Hedin, 187 †
Switzerland—
Maps: Eisenbahnkarte der Schweiz, 608 †
Syanak range, Central Asia, 348
Sykes, G., Journey in Libyan Desert, 602 †

Symonds, W. P., Nautical Astronomy, 87 †
Synge, M. B., A book of discovery, 89 †
Syria—
Syrian goddess; being translation of Lucian's 'De Dea Syria:' H. A. Strong, 301 †

T

Tabasco—
Estado de Tabasco, Situacion extension, y limites del: P. A. Gonzalez, 510 †
Tagliamento—
Valle del Tagliamento, Falde di detrito e coni di deiezione nella: M. Gortani, 505 †
Tai Shan: A. C. Moule, 507 †
Talbot, P. A., In Shadow of the Bush, 83 †, 477 §
Talmanca, Cordillera of, 479
Ta-lo-ho-pa, position, 384
Tamayo, A. E., Comunicación radiográfica directa entre Lima é Iquitos, 605 †
Tamm, —, Bericht über eine Erkundung des Dume und des Mara, 302 †
Tana river, British East Africa, 467
Tanganyika—
Au Tanganika, Les vents du lac: — Schwetz, 67 §, 508 †
Tarantaise—
Vie pastorale en Tarantaise: P. Arbos, 64 §, 79 †
Tararua Ranges, Discovery and extent of former glaciation in: G. L. Adkin, 86 †
Tardieu, G., Alpes de Provence, 474 §
Tarr, R. S., and L. Martin, Earthquakes at Yakutat bay, Alaska, 191 †
Tasmania—
Submarine bank discovered off coast of, 461
Tate, G. P., Seistan; memoir on history, etc., of country, 190 †, 373 §
Taurus—
Gebirgsbau des Taurus, Ueber den: F. Frech, 405 †
Tay—
Maps: Bathy-orographical map of Forth and Tay: W. & A. K. Johnston, 413 †
Taylor, E. G. R.: see Unstead, J. F.
Tchang, M., Tombeau des Liang, Famille Siao, 404 †
Temperature: see Meteorology
Teneriffe—
Impressions et observations dans un voyage à Teneriffe: J. Mascart, 405 †
Teram Kangri, Mr. Collins' Triangulation of: T. G. Longstaff, 300 †
Termier, P., L'Atlantide, 391 §, 606 †
Terrestrial Magnetism—
Land Magnetic Observations, 1905–1910: L. A. Bauer, 607 †
Magnetischen Missweisung über Europa, Die älteste Angabe der, festgestellt auf Grund der neuesten Berechnungen mittelalterlicher Deklination: W. Krebs, 513 †
Terrier, A., Frontières de Guinée Française de Sierra Leone et du Liberia, 302 †, 407,†
Texcuco, Lake, Mexico, 589
Thaba Bosigo sand-dunes, Note on: G. H. Stanley, 508 †
Thalbitzer, —, remarks on "Distribution of Human and Animal Life in Western Arctic America," 460
Theal, G. McC., Catalogue of books and pamphlets relating to Africa south of Zambesi, 191 †
Theodolite, Tangent-micrometer, 359
Thessaly and Vale of Tempe: W. W. Hyde 599 †
Thiele, E. O., remarks on "Southern Nigeria; some considerations of its structure," etc., 35
Thimm, C. A., and P. T. Hanssen, Norwegian self-taught, 298 †
Thiselton-Dyer, Sir W. T., Sir Joseph Dalton Hooker, 1817–1911..412 †
Thomas, N. W., Anthropological report on Ibo-speaking peoples of Nigeria, 602 †
Thomson, B., remarks on "Vasco Nuñez de Balboa, 1513–1913," 531
Thorbecke, F., Expedition in Kamerun, 167
Thoulet, J., Étude bathylithologique des côtes du Golfe du Lion, 598 †
Thoulet, M. G., Étude des fonds marins de la baie de Seine, 599 †
Thrace—
Historical geography, 334
Thureau-Dangin, F., Une relation de la huitième campagne de Sargon, 299 †
Thuringia—
Verbreitung der Slaven in Südwest-Thuringien: L. Gerbing, 504 †
Thurnwald, R., Probleme der ethno-psychologischen Forschung, 88 †
Thwaites, F. T.: see Hotchkiss, W. O.
Thys, R., La rivière Inkisi, 190 †
Tian-Shan—
Geografischer Forschung im Tianschan, Ueber einige Ergebnisse neuerer: F. Machaček, 405 †
Tremblement de terre de Tien-Chan, December 22, 1910: C. Bogdanovitch, 189 †
Westlichste Tienschan: F. Machachek, 600 †
Tibet—
Kartenwerk Nordost-Tibet, Ergänzungsband zum: W. Filchner, 601 †
Ontekingsreiziger in de Himalaya en in Tibet (1624–1630): C. Wessels, 300 †
River-Valleys of South-East Tibet: F. K. Ward, 586
Tibet, China, and India: P. Landon, 403 †
Tibetan-English Dictionary: H. A. Jäschke, 90 †
Ticino—
Uebertiefung des Tessingebietes: H. Lautensach, 80 †

Tides—
Tides and rigidity of Earth: A. E. Love, 513 †
Tierra del Fuego—
Travels in Patagonia and Tierra del Fuego: C. W. Furlong, 85 †
Tikar, Kamerun, 167
Tilby, A. W., English People Overseas, vol. 5, Australasia, 1688–1911 ..193 †
Tilho, —, et — Troadec, Détermination des longitudes en campagne par télégraphie sans fil, 305 †
Timbuctu—
Through Timbuctu and across Great Sahara: A. H. Haywood, 278 §
Time—
French Colonies, Time in, 290
Projet d'Organization d'un Service International de l'Heure: C. Lallemand, 512 †
Timor—
Volcanic character of: G. I. Adams, 385
Tirol—
Kartenbildes von Tirol bis um die Mitte des 16. Jahrhunderts, Entwicklung der: A. Feuerstein, 282 §, 401 †
Tischbein, H., Beitrag zur Landeskunde des Warnowgebietes, 402 †
Titteri, sa structure, son modelé: A. Joly, 508 †
Tomaschek, W., Zur Historischen Topographie von Kleinasien im Mittelalter, 91 †
Tongking—
Irrigation dans delta du Tonkin: E. Chassigneux, 300 †
Maps: Carte du Delta du Tonkin (Service Géog. de l'Indo-Chine), 93 †
Toppin, H. S., letter on Mountain Sickness, 399; letter on Peru-Bolivian Boundary, 295
Torcy, — de, Transports maritimes sur la côte du Maroc et port d'Aïyr, 83 †
Torday, E., Camp and tramp in African Wilds, 405 †
Töss valley—
Wirtschafts- und Siedlungsgeographie des Tösstales: H. Bernhard, 188 †
Tower, W. S., Geografia cientifica, 412 †
Trade Winds of Atlantic, Some long-period fluctuations in: J. S. Dines, 512 †
Transcaspia—
Vegetation of Transcaspian Lowlands, Studies on: O. Paulsen, 578 §
Travers, D., remarks on "David Livingstone," 447
Tregelles, J. A., Photographs of Colombia, 200 †
Treich-Laplène, M., Journeys in Ivory Coast, 377
Tremearne, A. J., Hausa superstitions and customs, 407 †, 582 §; Tailed Head Hunters of Nigeria, 582 §
Trent—
Ancient and modern Trent: B. Smith, 506 †
Troves, Sir F., Land that is desolate, 82 †
Trinidad—
Maps: Map of Trinidad: E. Stanford, 610 †
Tripoli—
Arabs in Tripoli: A. Ostler, 191 †
En Tripolitaine: E. Bernet, 477 §
Libya Italica: P. Vinassa, 477 §
Monografie e rapporti coloniali. Lettera sulla Libia del G. Schweinfurth al A. Borzi, 603 †
Pionieri Italiani in Libia, 191 †
Tripolitaine et Cyrenaïque, étude historique et ethnographique: A. Baschmakoff, 603 †
Troadec, —: *see* Tilho, —
Tropical colonization—
Klimawirkungen der Tropenländer als Fundament der Akklimatization: Prof. Däubler, 195 †
Tropical sunlight—
Effect of tropical sunlight upon men, etc.: H. G. Gibbs, 195 †
Study of tropical sunlight, Result of: P. C. Freer, 195 †
Trotter, Sir H., remarks on "Balkan Peninsula," 339
Trotter, S., Faunal divisions of Eastern North America in relation to vegetation, 604 †
Troy, A Study in Homeric Geography: W. Leaf, 371 §
Tsang-po—
Letter from A. Bentinck on Tsang-po and Dihong, 499
Letters from C. Du Riche Preller on Tsang-po and Dihong, 293, 500
River Tsang-po, 111
Tsin-ling mountains, China, 563, 564
Tunis—
Agriculture indigène en Tunisie: P. Decker-David, 603 †
Canal du Djerid: G. Barrion, 603 †
Maps: Algérie, Tunisie (Gouvernement Gén. de l'Algérie), 415 †; Tunisie (Service Géo. de l'Armée), 94 †
Tunisia—
Gravità relativa in Tunisia e a Malta nel 1908, Determinazioni di: A. Venturi, 599 †
Turkestan—
Conférence de P. Pelliot (sur son voyage du Turkestan russe au Kansou), 189 †
Duab of Turkestan: W. R. Rickmers, 301 †
Klima von Turkestan: F. Machaček, 66 §, 405 †
Turkey—
Maps: Stanford's Large Map of country between Bulgaria and Constantinople, 93 †
Passing of Turkish Empire in Europe: B. G. Baker, 403 †

Turkey-in-Asia—
Explorations by Baron von Handel-Mazetti, 165
Turnerelli, E. T., Russia on borders of Asia, 91 †
Türstig, R., Verdunstung auf dem Nil bei Khartum, 406 †
Tuscany—
Toponomastica toscana, D'alcuni elementi etruschi nella: S. Pieri, 505 †
Tutkovski, P. A., Orographical sketch of Central and Southern Polesie, 187 †
Twining, P. G., Dominion of Canada, 407 †
Tyrell, J. B., Hearne's Journey from Prince of Wales' Fort in Hudson's bay to Northern Ocean in 1769–1772..379 §

U.

Uaso Nyiro river, British East Africa, 467
Ubangi—
Passe de Zinga: Briart, 190 †
Udi highlands, Nigeria, 26
Uganda—
Arc of meridian in Uganda, report of measurement of an, 302 †
Aux sources du nil par Chemin de Fer de l'Ouganda: J. Leclercq, 83 †
Soldiering and sport in Uganda: E. G. D. Lardner, 191 †
Uhle, M., Los origenes de los Incas, 605 †
Ule, W., Eine Studienreise nach Südamerika, 408 †
Um-er-Rebia, Morocco, 232, 234
United Kingdom—
Geological Survey. District Memoirs and Sheet Memoirs, 91 †
Historical geography of British Isles, An elementary: M. S. Elliott, 403 †
Itineraries and road-books, Notes on British and Irish: Sir H. G. Fordham, 189 †
Ordnance Survey, Report of progress of, 506 †
Premier Road-Book of Great Britain: A. Gross and F. Waite-Browne, 600 †
Rain, Distribution of, in space and time over British Isles during 1911: H. R. Mill, 188 †
Romanization of Roman Britain: F. Haverfield, 272 §
Tillage, Trade, and Invention: G. T. Warner, 81 †
United States—
Cotton Manufacturing Industry of United States: M. T. Copeland, 604 †
Fisheries; an example of attitude towards resources: R. M. Keir, 84 †
Magnetic Observations made by Coast and Geodetic Survey, Results of: R. L. Faris, 192 †
Map, Millionth, Progress of, 388
Maps of Spanish possessions, Descriptive list of: W. Lowery and P. L. Philips, 510 †
United States—*continued*.
Maps: Bacon's Excelsior Map of United States, 416 †
Mining districts of Western United States: J. M. Hill and W. Lindgren, 408 †
National Parks, Our: L. F. Schmeckebier, 85 †
Triangulation along 98th meridian: W. Bowie and A. L. Baldwin, 192 †
United States of North America: E. Blackwelder, 303 †
Unstead, J. F., remarks on Election of Women as Fellows, 185; and E. G. R. Taylor, Essentials of World Geography for Junior Students, 162 §
Ural mountains—
Nature and people of Southern Urals: A. Phlerovski, 187 †
Urdaneta, Andres de Voyages, across Pacific, 526
Urubamba, Cañon of: I. Bowman, 491
Uruguay—
Diccionario geografico del Uruguay: O. Aranjo, 86 †
Usu volcano—
Nachrichten über den Ausbruch des Vulkans Usu in Japan im Jahre 1910: H. Simotomai, 404 †
Utica—
Golfe d'Utique et bouches de Medjerdah: A. Bernard, 407 †

V.

Vacano, M. J. von, Aus dem Erde der Inkas, 85 †
Vahsel bay, Antarctic, 357
Valentine, E. S., Cambridge County Geographies, Forfarshire, 81 †
Valley-forms—
Glaziale Taltrog: A. Philippson, 513 †
Taltröge: J. Stiny, 513 †
Valleys—
Alter und Form der Täler: A. Hettner, 607 †
Begriff und Berechnung der mittleren Neigung einer Gefällskurve: A. Böhm, 87 †
Schliffkehle und Taltrog: A. Penck, 87 †
Vancouver—
Maps: Vancouver Island and adjacent mainland of British Columbia: F. N. Hibben & Co., 94 †
Photographs of Nitinat district, Vancouver island, 612 †
Southern Vancouver Island: C. H. Clapp, 285 §, 407 †
Van der Ven, F. F., Exploration of Central Range of New Guinea, 591
Van Hecht J. Aanteekeningen betuffende het eiland Ceram of Seram, 507 †
Van Loo, L., Agriculture en Chine, 403 †

Van't Hoff, J. H. Bildungsverhältnisse der ozeanischen Salzablagerungen, 305 †
Vasco Nuñez de Balboa, 1513–1913: Sir C. R. Markham, 517 *
Vassilevsky, N. J., Explorations géologiques le long des rivières Lovate, Kounia, etc., 298 †
Venetia—
Distribuzione delle pioggie nella Regione Veneta durante 1909–10: G. Magrini, 505 †
Venezuela—
Anuario Estadistica de Venezuela, 1909 .. 304 †
Venturi, A., Determinazioni di gravita relativa in Tunisia e a Malta nel 1908.. 599 †
Verbrugge, R., Si-Wan-Ze (Mongolia), 401 †
Vespucci—
Americ Vespuce Attribution de son nom au Nouveau-Monde: H. Vignaud, 392 §, 513 †
Vesuvius—
Eruptionskegels des Vesuv und des Vesuvkraters, Karten des: I. Friedlaender, 403 †
Victoria Nyanza—
From Victoria Nyanza to Kisii Highlands: F. Oswald, 114 *
Prospecting from Victoria Nyanza to Lake Mweru: — McQueen, 602 †
Vidal de la Blache, P., Interprétation géographique des paysages, 410 †
Vidier, A., Mappemonde de Théodulfe et mappemonde de Ripoll, 514 †
Vignaud, H., Americ Vespuce Attribution de son nom au Nouveau-Monde, 392 §, 513 †
Vinassa, P., Libya Italica, 477 §
Vinokurof, A., Issyk mountain lake in Trans-Ilian Alatau, 82 †
Virga, A. de, Weltkarte des: F. R. Wieser, 516 †
Virginia—
Battlefields in Northern Virginia, Visit to some: F. R. Sedgwick, 408 †
Vischer, —, An der Serbischen Front, 598 †
Vislukh, J. K., Volcanic province Uyun Kholdon in North Manchuria, 601 †
Visoke mountain, Mufumbiro range, 535
Vistula—
Landschaftsnatur der deutschen Weichselufer: F. Braun, 504 †
Vitcos, last Inca capital: H. Bingham, 408 †
Vladimirtsoff, B., Explanation of a map of North-Western Mongolia, 601 †
Vodena, Macedonia, 339
Vogel, C., Karte des Deutschen Reichs im Massstab, 1,500,000 .. 414 †
Volcanic phenomenon—
Flashing arcs: F. A. Perret, 513 †
Volcanic vortex rings and direct conversion of lava into ash: F. A. Perret, 513 †
Volcanoes—
Aufsteigen der Luft über tätigen Vulkanen: K. Wegener, 194 †
Structure and significance: T. G. Bonney, 607 †
Vujevich, P., Influence of surrounding seas on temperature in Balkan Peninsula, 79 †

W.

Wagner, H., Land und Wasser auf der Erdoberfläche, 88 †; Lehrbuch der Geographie, 307 †
Wa-Gosha tribes, Jubaland, 559
Waipara gorge, Lower, Preliminary account of: R. Speight, 87 †
Wajheir, British E. Africa, 466
Wal, J. T., Verkenning der Idenburg rivier in Nieuw-Guinea, 86 †
Walcott, H. P., Alexander Agassiz, 412 †
Waldburg-Zeil, Grafen Karl, Sibirischen Forschungsreisen des, 301 †
Wales—
Gallant little Wales: J. Marks, 403 †
Geological structure of Central Wales: O. T. Jones, 299 †
Walker, G. W., Graphical construction for epicentre of an earthquake, 194 †
Walker, Lake, Salinity of, letter from J. W. Redway on, 178, 296
Wallace, H. F., Big Game of Central and Western China, 601 †
Walle, P., L'Argentine telle qu'elle est, 192 †, 479 §
Wallis, B. C., Use of statistics in teaching of geography, 306 †
Walton, H. G.: *see* Nevill, H. R.
Wama lake, Jubaland, 555
War Office, Catalogue of, Part III., subject index, 306 †
Ward, F. K., Great River-Valleys of South-East Tibet, 586
Ward, H. F., and J. W. Milligan, Handbook of British East Africa, 1912.. 59 §
Ward, Lock & Co., Handbook to Belgium, 475 §
Warming, E.: *see* Rosenvinge, L. K.
Warner, G. T., Tillage, Trade and Invention, 81 †
Warwickshire—
Place-names: W. H. Duignan, 81 †
Watches and chronographs for surveying, and night-marching watch, 261, 265
Water-supply—
Trinkwasserversorgung primitiver Völker: A. Haberlandt, 89 †
Watson, L. W., Geological age of Prince Edward Island, 509 †
Watt, S., In heart of savagedom, 190 †
Wauters, A. J., Voies d'accès au Lac Tchad, 407 †
Wavell, A. J., Modern Pilgrim in Mecca, 273 §
Weather: *see* Meteorology
Weber, P. X., Pilatus und seine Geschichte, 598 †

Weedon, A. L., Report on Mariout district, 508 †
Weeks, J. H., Among Congo cannibals, 82 †, 477 §
Wegener, K., Aufsteigen der Luft über tätigen Vulkanen, 194 †
Weinthal, L., Story of Royal visit to Sudan, 1912..602 †
Weiss, M., Am Ruwenzori, 406 †; Geschichtliche Entwicklung der Photogrammetrie, etc., 305 †
Wellington physiography, Notes on: C. A. Cotton, 87 †
Werner, A., Languages of Africa, 602 †
Wessels, C., Een ontdekingsreiziger in de Himalaya en in Tibet (1624–1630), 300 †
Westermann, D., Shilluk people: their language and folklore, 191 †
Westropp, T. J., Brasil and legendary islands of North Atlantic, 89 †
Wetherill, H. B., New Preliminary Geography, 162 §
Whales, Bay of, Antarctic, 2, 3, 13
Wheeler, A. O., Mountains of Yellowhead Pass, 604 †; Topographical Map showing Mount Robson, etc., 309 †
Whitaker, W., and H. R. Mill, Water supply of Surrey, 299 †
White, F., Rainfall in Tropical Areas, etc., 512 †
Whitney, C., Flowing Road: Adventuring on great rivers of South America, 86 †
Who's who in science, 1913: H. H. Stephenson, 195 †
Wichmann, A., Entdeckungsgeschichte von New Guinea (1885 bis 1902), 193 †
Wichmann, H., Insel Palmyra und der Panamakanal, 87 †
Wiese, — v., übers eine Expedition vom Tsad-See zum Nil, 84 †
Wieser, F. R. v., Weltkarte des Albertin de Virga aus dem Anfange des XV. Jahrhunderts in der Sammlung Figdor in Wien, 516 †
Wight, Isle of—
  Landschaftsbild der Insel Wight: L. Ritter v. Sawichi, 506 †
Wilderness and Jungle, Book of the: F. Aflalo, 63 §
Williams, M. Y., Geology of Arisaig-Antigonish district, Nova Scotia, 303 †
Williamson, R. W., Mafulu Mountain People of British New Guinea, 60 §
Willis, B. (*see also* Hrdlicka, A.), Seccion cordillerana del ferrocarril transcontinental de San Antonio à Valdivia, 510 †
Wilson, E. A., R.G.S. Medal awarded to, 358; obituary, 393
Wilson, H. A., British Borderland, 602 †
Wilson-Barker, D., obituary of Lieut. H. R. Bowers, 395
Wind—
  Täglichen Änderungen der Windstärke auf dem Gipfel des Ben Nevis: J. v. Hann, 411 †
Windle, B. C., On certain megalithic remains immediately surrounding Lough Gur, 299 †
Wireless Telegraphy, Longitude by, 249
Wisconsin—
  Maps: Wisconsin showing geology and Roads: W. O. Hotchkiss and F. T. Thwaites, 515 †
Wittenburg, P. v., Geologische Skizze der Halbinsel Murawijew-Amursky und Insel Russky, 405 †
Witting, R., Zusammenfassende Uebersicht der Hydrographie des Bottnischen und Finnischen Meerbusens, etc., 473 §
Witwatersrand—
  Water-supply of Witwatersrand: D. C. Leitch, 407 †
Wolkenhauer, A., Formen der deutschen Dörfer und ihre Verbreitung, 383 §, 402 †
Wollaston, A. F. R., Ascent of Mount Carstensz, 391; Expedition to Dutch New Guinea, 492
Woodward, H. B., Geology of soils and substrata, 305 †
Workman, F. B., letter on Spelling of Baltoro and Saltoro, 398; Some Notes on my 1912 expedition to Siachen or Rose glacier, 507 †
World—
  Briefe Description of Whole World: G. Abbot, 90 †
  Chronology and history of World: J. Blair, 90 †
  Customs of the World: W. Hutchinson, 195 †
  Globe: Bacon's New Globe with Contour Colouring, 95 †; Philip's Panama Canal Route, 516 †
  International one-in-a-million map of World: A. R. Hinks, 606 †
  Map-reading Cards, Philips' Practical: H. H. Goodacre, 95 †
  Maps: Atlas of the World: J. G. Bartholomew, 416 †; International map of World. North America, Boston (U.S. Geol. Survey), 198 †; Official Wireless Map of World (Marconi's Wireless Telegraph Co.), 611 †; Trade and Industrial Map of World on Mercator's Projection: B. H. Morgan, 515 †; Weltkarte des Albertin de Virga aus dem Anfange des XV. Jahrhunderts in der Sammlung Figdor in Wien: F. R. v. Wieser, 516 †
Wray, W. A.: *see* Holmes, A.
Wright, A. (*see also* Lloyd, R.), and T. H. Reid, Malay Peninsula, 81 †
Wright, F. E.: *see* Hrdlicka, A.
Wünschmann, K., Vergletscherung des Harzvorlandes, 402 †

Y.

Yale Peruvian Expedition of 1912..390
Yangtse—
  Course of river, 566

Year-book—
Who's who in science, 1913: H. H. Stephenson, 195 †
Yellowhead pass, Mountains of: A. O. Wheeler, 604 †
Yenisei river—
Basin of Upper Yenisei, Notes on Map illustrating Exploration in: D. W. Carruthers, 346
Yigrung river, Abor country, 107
Yorkshire—
Lost towns of Yorkshire coast: T. Sheppard, 81 †, 370 §
Moorlands of North-Eastern Yorkshire: F. Elgee, 189 †
Yorubaland, Nigeria, People of, 25–32, 36
Yosemite Trails: J. S. Chase, 59 §
Young, K., Scinde in the Forties, 376 §
Yucatan—
Peninsula of Yucatan: E. Huntington, 604 †
Yunnan—
Hinterindiens Riesenströmen: R. Brunhuber, 300 †
Maps: Carte geologique du Yunnan Oriental, 609 †

Z.

Zambesi—
Boundary between British and Portuguese possessions, Agreement between United Kingdom and Portugal respecting, 53 †
Navagibility in Livingstone's time, 430
Paese e le tribù dell' Alto Zambesi: L. Jalla, 83 †
Zealley, A., Mineral survey of zinc and lead deposits of Broken Hill, North Rhodesia, 406 †
Zeilon, N., On tidal boundary-waves and related hydrodynamical problems, 88 †
Zeiss level for surveying, 253
Zeltner, F. de, Mission dans Sahel Soudanais, 406 †
Zermatt—
Names of Zermatt: W. A. B. Coolidge, 188 †
Zimbabwe—
Zimbabwe, an architect's notes: F. E. Masey, 603 †

INDEX TO MAPS.

EUROPE.

Long Valley and Environs, Aldershot, The: A. G. Ogilvie, 612
Sanjak of Novibazar, Sketch-map, 469

ASIA.

Abor Expedition, Map illustrating Geographical Results of: A. Bentinck, 200
Baghdad Railway, Sketch-maps showing progress of, 245, 247
Karlik Tagh and Barkul Mountains, from Plane-table Survey: D. Carruthers, 420
Yenisei, Upper, Basin of: D. Carruthers, 420

AFRICA.

British East Africa. District between Victoria Nyanza and Kisii Highlands: F. Oswald, 200
British East Africa, Part of, to illustrate paper by F. Elliott, 555
British East Africa. Sketch-map of journey from Kismayu to Meru: C. W. Haywood, 464
Equatorial and South Africa, before and after Livingstone's researches, 516
Morocco, Spanish spheres of influence, according to the Treaty of 1912.. 233
Nigeria, Southern, illustrating paper by A. E. Kitson, 96
Uganda Protectorate: Survey of Anglo-German-Belgian Boundary Region: E. M. Jack

AMERICA.

Alaska and Canada, Sketch-map of country adjacent to Northern Section of Boundary between: D. H. Nelles, 96
Canada and Alaska, Sketch-map illustrating paper by V. Stefansson, 516
Labrador. Sketch-map of Saint Augustine River, showing explorations of H. G. Bryant, 340
Missouri: Generalized Map showing Physiographic Divisions of Missouri, 42; Generalized Relief Map of Missouri, 43; Sketch-maps, illustrating Geographical Interpretation of Missouri, 136–145
United States, Route of American Geographical Society's Excursion, 1912.. 351

AUSTRALASIA AND PACIFIC.

Pacific ocean, Vasco Nuñez de Balboa's Discovery of the, Map to illustrate paper on: Sir Clements Markham, 612

POLAR REGIONS.

Antarctic, Routes of Amundsen's South Polar Expedition, 1911–12..96
Antarctic, showing sphere of operations of British Antarctic Expedition, 1910–13, under R. F. Scott, 225
Greenland, North-East, Sketch-map illustrating E. Mikkelsen's Expedition, 1909–12..420

GENERAL.

Pacific Ocean, South, Sketch-maps showing Submarine Banks, 461, 462
World, showing Principal Wireless Telegraph Stations, 251

ILLUSTRATIONS AND DIAGRAMS.

EUROPE.

English Desert—
Effect of torrential erosion on Long Hill, 570
Long Valley, View across, from Long Hill, 570
Ravine of wady, on north edge of plateau, 570

English Desert—*continued.*
Sand-dune, with bent grass on margin of desert, 571
Stream entering desert area, 570
Wady bed at north-east margin of desert, 571
Wind erosion, Effects of, in Long Valley, 571

ASIA.

Abor Expedition—
Abors at Riga camp, 100
Country near Paling, 101
Dihong valley near Gette, 100

Abor Expedition—*continued.*
Gorge below Kitgor hill, 101
Komsing, 100

AFRICA.

British East Africa—
Asego cone, 123
Granite obelisk of Gongogongo, 122
Kuja gorge and Vinyo escarpment, 122
Manga escarpment, 123
Nakanero hill, Summit of, 122
Nundowat hill and upper part of Miocene beds at Kachuku, 118
Simbi, Lake, 123
Swamp near Karungu, 118
Water-lilies in Olasi valley, 119
Women carrying fish-traps, Awash river, 119

Jubaland—
Boni village, 556
Bridge of creeping vines made by Wa Gosha, 556
Kismayu, showing sandhills, 556
Somali, The raw and trained, 557

Morocco—
Argan tree, 235
Forest of Arar, Jebel Amsiten, 233

Morocco—*continued.*
Forest of cork-oak, Shawia country, 233
Hauara, Plain of, 235
Jebel Siroua from north, 232
Landforms of Meseta Border, diagram, 232
Morocco after elevation of mountain chains, and after opening of Strait of Gibraltar, diagrams, 231
Oasis in upper Draa, 235
Plain of the "Tirs" near Ber Reshid, 233
Shawia country, Dissected peneplain in, 232
Um-Er-Rebia, Valley of, 232
Valley in the Meseta, Form of, diagram, 236

Mufumbiro mountains—
Kivu, Lake, 541
Mufumbiro range, 540
Mutanda, Lake, 540
Swamp in Rukiga, 541

Nigeria, Southern—
Bare granite hill, with mud-walled compounds of old Tapa, Yorubaland, 21
Ibibio waterside market, 29
Ibo chief's compound, with war-tower and inner wall. Natives listening to phonograph, 29
Ibo mud-modellings, Onitsha district, 28
Ibo women of Ibuza, with cicatrized designs on bodies, 21
Ibo yam-mounds, with young plants, 29
Nigeria, Southern—*continued.*
Inyaba valley from Udi highlands, 20
Mineral survey party on march, Oguta district, 28
Niger river at Idda. Mineral survey party leaving for Onitsha, 28
Painted wooden figures of animals, etc., of Ibo ceremonial dances, 28
Trading station of Miller Bros., Siluko, Central province, 20
Yoruba carriers, yams and brass rod used in barter, 21

AMERICA.

Missouri—
Early settler's dwelling, 44
Kansas drift in glacial prairie, Section of, 46
Mississippi, View looking north up gorge of, 47
Old prairie, View of, 45
Ozarks, dissected, 44
Ozarks, Eastern, Looking towards face of a small escarpment on, 44
Pilot knob, one of St. François mountains, 47
Missouri—*continued.*
Revetment built into Missouri to protect shore from erosion, 45
"River Hills" between Mississippi and Glacial prairie, 45
Swamp in south-eastern lowlands, drained and partly cleared, 46
Panama canal—
Cross-section of Culebra cut, at point of greatest width, 240

POLAR REGIONS.

Antarctic disaster—
Bowers, Lieut. H. R., Portrait of, 214
Evans, Petty Officer Edgar, Portrait of, 215
Scott, Captain R. F., Portrait of, 201
Scott, Captain, in his hut, 210
Scott, Captain, on ski, 211
Oates, Captain L. E. G., Portrait of, 213
Wilson, Dr. E. A., Portrait of, 212

Arctic America, Western—
Ancient conical stone house, Simpson bay, 452
Barren ground, Typical, 456
Boulders of ice, 457
Boys of south-west Victoria island, age about six and eight years, 453
Coronation Gulf islands, seen from south-west, 452
Eskimo men and woman, 453
Arctic America, Western—*continued.*
"Mud volcano," 457
Natural bridge near Point Dease Thompson, 456

Greenland, North-East—
Ice-cap, 316
Inland ice, 317
Watercourses intersecting ice-cap, 316

Norwegian South Polar Expedition—
Amundsen, Roald, Portrait of, 2
At the South Pole, December 16, 17, 1911..11
Broken country on ice barrier, 7
Depôt and mountains at 85° S., 8
Don Pedro Christopherson, Mount, 10
Fridtjof Nansen, Mount, 15,900 feet high, 9
Large filled-up chasm, Devil's glacier, 6
Scott's nunatak, 3

GENERAL.

Instruments for Geographical Surveying—
Astrolabe à prisme, 268, 269
Folding telescopic alidade, 257
Night-marching watch, 266
Orel's stereo-autograph, 364
Plane-table clinometer, New, 258
Transit theodolite with tangent micrometers, 361
Instruments for Geographical Surveying—*continued*.
United States precise level, 256
Watts' portable level, 256
Zeiss level, 253
Livingstone, David, Portrait of, 421

END OF VOL. XLI.

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